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SARGENTIA

A CONTINUATION OF THE
CONTRIBUTIONS FROM THE ARNOLD ARBORETUM
OF HARVARD UNIVERSITY

IV

MATERIALS FOR A FLORA OF THE CONTINENTAL NORTHWEST TERRITORIES OF CANADA

BY

A. E. PORSILD

THE WILLOWS OF THE HUDSON BAY REGION AND THE LABRADOR PENINSULA

BY

HUGH M. RAUP

WITH FOUR PLATES

PUBLISHED BY
THE ARNOLD ARBORETUM OF HARVARD UNIVERSITY
JAMAICA PLAIN, MASS., U. S. A.
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MATERIALS FOR A FLORA OF THE CONTINENTAL NORTHWEST TERRITORIES OF CANADA *

A. E. Porsild

INTRODUCTION

Some of the earliest and most important botanical collections ever made in Canada came from the country between Hudson Bay and the Mackenzie River. This region was then known as Rupert's Land, part of which is now included in the present Northwest Territories.

By far the most important and extensive of these collections were made by the surgeon-naturalist and explorer Sir John Richardson, who, between the years 1819 and 1827, accompanied, as physician and naturalist, Sir John Franklin's first and second expeditions "to the shores of the Polar Sea," undertaken in the years 1819–22 and 1825–27. Later, 1848–49, Richardson led an expedition of his own in search of the missing Franklin Expedition of 1845. Large numbers of common Canadian plants and animals, until then unknown to science and to the rest of the world, were described from specimens brought back by Richardson and other members of the Franklin expeditions. It is but a fitting recognition of the work done that so many Canadian plants and animals are named in honor of such men as Richardson, Franklin, Drummond, Sabine, Hood, and Parry, to mention but a few of those intrepid pioneers in the scientific exploration of Canada, who, often under the greatest difficulties, personal danger, and hardship, brought back to the outside world specimens of the then unknown Canadian flora and fauna.

A number of Richardson's plants were described and named by himself, others by Robert Brown in the botanical appendices to the reports of the Franklin expeditions. In all, Richardson reported 474 species of flowering plants and ferns, in addition to lower cryptogams, from what is now known as the Northwest Territories.

In 1819 another British expedition, under W. E. Parry, in the Hecla and the Griper, wintered on Melville Island. The botanical collections made by Edward Sabine and other members of the expedition were described by Robert Brown in his famous "Chloris Melvilliana," thereby laying the foundation for our present knowledge of the flora of Canada's arctic islands. Between 1829 and 1840 appeared W. J. Hooker's classic "Flora Boreali-Americana," which until this day remains one of the standard handbooks on the flora of northern North America. As far as the continental parts of the Northwest Territories were concerned, information on the flora was based almost entirely on the results brought back by the Franklin Expeditions.

In 1859 a young United States naturalist, Robert Kennicott, descended the Mackenzie River to the Peel, and crossed into Alaska. Owing to Kennicott's premature death in 1866, a description of his small but important botanical collection was never published.

* Publication of this paper was made possible by special funds provided for the purpose.—E. D. Merrill.

In the years between 1887 and 1900 important contributions were made by members of the Geological Survey and the Topographical Survey of Canada: from the unexplored country between the Mackenzie drainage basin and Hudson Bay by J. B. and J. W. Tyrrell, and from the western shore of Hudson Bay by Robert Bell.

A comprehensive account of the woody plants of the Mackenzie Basin was given by E. A. Preble in an appendix to his "Biological Investigation of the Athabasca-Mackenzie Region."

John Macoun, in his "Catalogue of Canadian Plants," completed in 1890, included the collections of the latter part of the nineteenth century, but for the geographical distribution of arctic plants depended in the main upon Hooker's Flora. Later additions to the flora of the Northwest Territories, including the important collections made on the west shore of Hudson Bay by J. M. Macoun in 1910, were published in appendices to reports of the Geological Survey of Canada.

In 1906 appeared H. G. Simmons' "The Vascular Plants in the Flora of Ellesmereland" and in 1913 his "Survey of the Phytogeography of the Arctic American Archipelago." These were based largely upon his work as a botanist with Sverdrup's expedition in the Fram, 1898–1902, as well as upon the published and unpublished records of previous collections in the archipelago.

In 1909 C. H. Ostenfeld published the important botanical results of Amundsen's Northwest Passage in the Gjöa, 1904–06. Since the appearance of these works, which had all dealt largely with the flora of the Arctic Archipelago, important collections were made during the Canadian Arctic Expedition of 1913–18, chiefly by Frits Johansen and other members of the southern party under R. M. Anderson. This expedition collected plants along the mainland arctic coast from Alaska eastward to Bathurst Inlet and from the south shore of Victoria Island. The botanical results, by J. M. Macoun, Theodore Holm, Frits Johansen and others, were published in Volumes IV and V of the scientific report.

Members of the Fifth Thule Expedition, 1921–24, under the leadership of Knud Rasmussen, collected plants chiefly in the Keewatin District. An account of their work has been pubished by Johs. Grøntved in the Report of the Fifth Thule Expedition, Vol. 2, No. 1, 1936.

In 1940 appeared the first part of Nicholas Polunin's "Botany of the Canadian Eastern Arctic." This important work brings up to date our knowledge of the flora of the Eastern Arctic, but the area covered by it extends only to the western shore of Hudson Bay.

By far the most important contribution to our knowledge of the flora of the continental Northwest Territories since Hooker's Flora is Hugh M. Raup's "Phytogeographic Studies in the Athabaska-Great Slave Lake Region," 1936, and "Botanical Investigations in Wood Buffalo Park," 1935, based largely upon his own very extensive collections made in the course of several expeditions to that region. In 1939 Raup spent a summer in the Mackenzie Mountains and his report on the flora of this very inaccessible and little-explored region is now in preparation.

In 1927–28 the writer, with his brother, R. T. Porsild, while engaged in a grazing reconnaissance, collected plants in the northwestern part of the Mackenzie District, between the Mackenzie Delta and Anderson River, and in the Great Bear Lake basin.[1] The great distance to be covered, coupled with trans-

[1] A. E. Porsild. Reindeer Grazing in Northwest Canada. Department of Interior Publ. 1929, pp. 1–46.

portation difficulties and the very short arctic summers, made it impossible to do as much collecting as might have been desirable. Thus in one twelve-month period, in 1927–28, the writer moved his camp no less than 106 times. The collections of 1927–28 were added to materially during the years 1932–35, when the writer was stationed in the Mackenzie Delta.

In 1931 the writer made a botanical survey of central Keewatin, from the Yathkyed Lake basin down Kazan River to Baker Lake.[2] The vascular plants collected in the Northwest Territories during this and his earlier and later expeditions aggregate 5600 numbers, or over 30,000 herbarium specimens.

In 1941 appeared the first part of Eric Hultén's monumental "Flora of Alaska and Yukon." The second part, though printed in 1942, has not been widely distributed due to the war. When completed, this will bring together all contemporary knowledge of the flora of that region, which, because of the large land areas known to have been unglaciated there, must be considered the most important, floristically and phytogeographically, in the entire American Arctic.

Only a few trained botanical collectors have ever visited the Northwest Territories, and most of the collections of plants that have found their way into botanical museums and private herbaria have been made by travellers who have had no special botanical training and to whom the collection of plants was not the principal objective. For this reason nearly all species of aquatic plants, as well as some of the difficult and critical families and genera, such as Gramineae, Cyperaceae, Salicaceae, *Potentilla, Antennaria, Taraxacum,* and others, are as a rule but poorly represented in their collections. Until the advent of the airplane all travellers in the north, at least during the summer, were compelled to follow the rivers and navigable canoe routes. Our present knowledge of the flora, therefore, on account of the past inaccessibility of vast areas, is still very incomplete. Large tracts of land are still botanically unexplored, and the continental Northwest Territories even today remain among the least known large land areas in the northern hemisphere.

Thus, while all available data on the floras of adjacent Alaska-Yukon, the Arctic Archipelago, the Eastern Arctic, and the Upper Mackenzie Basin have recently been brought together and published in the works of Hultén, Simmons, Polunin, and Raup, for most of the Mackenzie and Keewatin Districts, Hooker's "Flora Boreali-Americana" still remains the principal published source of information.

Since 1936, the writer has been engaged in the compilation and preparation of materials for a flora of the Mackenzie and Keewatin Districts. The principal modern source of material for this work has been in the collections made by himself and R. T. Porsild, supplemented by a number of small collections gathered by others and located in the National Herbarium of Canada. To this have been added a few data found in other herbaria, chiefly the Gray Herbarium of Harvard University, the herbarium of the New York Botanical Garden, and the herbarium of the University of Copenhagen, Denmark.

This work was almost completed when the war stopped its final preparation and publication. In order to make some of the more important data available to other workers now engaged in studies of adjacent floras, it has been thought desirable at this time to publish, in a preliminary paper, descriptions of new species as well as the more important phytogeographical data. It is hoped that the main work, which will contain keys to the genera and complete data on distribution, as well as copious ecological notes, may be published before long.

[2] A. E. Porsild. Geographical Journal **88**[1]: 1–19. 1936.

At present 806 species, subspecies, and major varieties of well-defined geographical range are recognized in the flora of the Northwest Territories, while the number known to occur in the Mackenzie and Keewatin Districts is about 761. This number is made up as follows: Pteridophyta 27; Gymnospermae 6; Monocotyledoneae 213; Archichlamydeae 310; Metachlamydeae 205.

Phytogeographically the delimitations of the Mackenzie and the Keewatin Districts are unnatural ones. The great Mackenzie valley is a strongly marked phytogeographic boundary, and the flora of the mountainous part of the Mackenzie District which lies to the westward of the valley bears a much closer affinity to the flora of the Yukon Territory and Alaska than to that of the comparatively low and dry peneplain east of the Mackenzie valley. Large parts of this plain are covered with spruce woods and muskegs and must be a formidable barrier to the migration of numerous species of plants.

While, for practical reasons, the political boundaries are adopted to delimit most of the area covered by the present paper, a somewhat more satisfactory arrangement is achieved when the arctic sea-coast and coastal plain of the Yukon Territory are included with the Mackenzie District. This has been done in the present treatment. To the flora of the Mackenzie and Keewatin Districts have thus been added a few species that in Canada are restricted to the Yukon coast.

Of the 761 plants constituting the present known flora of the Mackenzie (including the Yukon coast) and Keewatin Districts, 345 are enumerated in the present catalogue. Nearly one hundred of these are plants that have not previously been recorded from, or that have not been known to occur in, the Northwest Territories, while about 30 are unrecorded from the Mackenzie District only. In addition the following 14 are believed to be "new" to the flora of Canada:

Carex rotundata
Carex rufina
Tofieldia nutans
Salix arbutifolia
Salix Chamissonis
Salix glacialis
Salix lingulata
Salix phlebophylla
Melandrium taimyrense
Draba Palanderiana
Astragalus Collieri
Eritrichium aretioides
Senecio Kjellmanii
Taraxacum alaskanum

Finally, in the writer's collections were 21 species and 4 varieties believed to be new and undescribed. Several of these, in the following list marked with an asterisk, have been described elsewhere, while the rest are described here.

**Potamogeton Porsildiorum* Fern.
Calamagrostis chordorrhiza n. sp.
Calamagrostis lapponica var. *nearctica* n. var.
Poa ammophila n. sp.
Kobresia arctica n. sp.
Carex atrofusca var. *decolorata* n. var.
Carex elynaeformis n. sp.
Carex Morrisseyi n. sp.
Carex rariflora var. *androgyna* n. var.
Melandrium Ostenfeldii n. sp.
Thlaspi arcticum n. sp.
Potentilla pulchella var. *gracilicaulis* n. var.
Oxytropis hyperborea n. sp.
Gentiana Raupii n. sp.
Antennaria crymophila n. sp.
Antennaria neoalaskana n. sp.
**Antennaria philonipha* A. E. Porsild
Petasites arcticus n. sp.
**Taraxacum Carthamopsis* M. P. Porsild
**Taraxacum* spp.[3]

[3] Five or six species of *Taraxacum* in the writer's collection have been named by Dr. Haglund, Lund, Sweden, but, as far as the writer is able to ascertain, the descriptions have not yet been published.

New combinations or names are proposed as follows:

Melandrium Drummondii n. comb.
Antennaria Ekmaniana n. nom.
Astragalus Collieri n. comb.

The remainder of the plants enumerated in the catalogue are critical entities in the flora or of unusual or little understood distribution.

ACKNOWLEDGMENTS

The writer is deeply indebted to a number of people who in various ways have assisted in this work. First of all he wishes to mention the large share of the collections contributed by his brother, Mr. R. T. Porsild of Dawson, Y. T., who in 1927 and 1928 accompanied him in the field.

To his father, Dr. Morten P. Porsild, Director of the Danish Arctic Station, Disko, Greenland, the writer is deeply indebted for his stimulating and untiring interest in the progress and advancement of this work and for innumerable suggestions and notes on critical species, but above all for his painstaking compilation and preparation, in 1926, of a manuscript pocket flora containing brief descriptions and keys, and in many cases also pen drawings, of all species which, previous to 1926, had been recorded from arctic and boreal America. This pocket flora, in two volumes, proved of inestimable value in the field when, due to the great difficulties of transportation, none but the most indispensable handbooks could be carried.

To the curators and staffs of a number of herbaria—the Gray Herbarium of Harvard University, Cambridge, Mass., the herbarium of the Arnold Arboretum of Harvard University, Jamaica Plain, Mass., the United States National Herbarium, Washington, D. C., the New York Botanical Garden, Bronx Park, New York, the Colorado Experiment Station, Colorado State College, Port Collins, Colorado, and the Botanical Museum of the University of Copenhagen, Denmark—the writer is deeply indebted for making their material of arctic American plants available for study.

The writer particularly wishes to express his gratitude to Professor M. L. Fernald and to Mr. C. A. Weatherby of the Gray Herbarium for valuable help in the solution of critical problems in taxonomy and nomenclature, as well as for much stimulating encouragement during several prolonged and most profitable visits to that institution.

Last, but not least, the writer is indebted to his friend Dr. Hugh M. Raup, of the Arnold Arboretum of Harvard University, whose own work on Arctic and boreal floras, like that of Professor Fernald, has been a constant source of inspiration, and who, over a period of years, has contributed numerous valuable suggestions.

The writer received much assistance in the preparation of the Latin descriptions from Mr. A. W. A. Brown. The descriptions were later revised by Dr. Leon Croizat, of the Arnold Arboretum of Harvard University.

THE CATALOGUE

In the catalogue, serial numbers between *1861* and *5358*, cited without collector's name, are those of the writer and his brother; numbers between *5368* and *7473* are those of the writer alone; in all other cases the collector's name has been given. Due to the necessity for conserving space, specimens are cited by serial number and the briefest possible data needed to identify the geographical position.

INDEX TO MAJOR COLLECTIONS CITED

Place and location	*Date*	*Serial Numbers*
ARCTIC COAST OF YUKON TERRITORY		
Shingle Pt., lat. 69° N.	July 12, 1933	*6729–6730*
"	Sept. 13, 1933	*6899–6911*
"	July 24, 1934	*7081–7115*
Between King & Kay Pts.	July 23, 1934	*7116–7208*
RICHARDSON MTS., west of Mackenzie Delta		
Slopes & foothills near Black Mt., between 1000 and 4000′ elev., approx. lat. 68° N.	July 7–10, 1933	*6577–6728*
Lower slopes of Black Mt.	Aug. 15–17, 1933	*6742–6878*
Lower slopes between 1000 and 1800′ elev.	Aug. 24–25, 1934	*7316–7350*
MACKENZIE RIVER DELTA		
Peel R., 20 mi. above Aklavik, Husky R.	June 27, 1935	*7398–7400*
Peel R., Aklavik	June 6–8, 1927	*1861–1872*
"	July 6, 1927	*3181–3184*
"	Sept. 1, 1934	*7302–7315*
Limestone hills, Campbell Lake	June 15, 16, 1927	*1873–1976*
Campbell Lake	June 17–21, 1927	*1978–2028*
East Branch, vicinity of Reindeer Station, wooded part about 68° 40′–50′ N.	June 26, 1932	*6500–6518*
"	July 31, 1932	*6519–6520*
"	Aug. 7, 1932	*6521–6535*
"	Aug. 14, 1932	*6536–6557*
"	Sept. 4, 1932	*6558–6560*
"	July 30, 1933	*6731–6741*
"	Aug. 6, 1933	*6879–6886*
"	July 30, 1933	*6887–6898*
Lakes near Reindeer Station	Oct. 16, 1933	*6912–6922*
Reindeer Station	June 20, 1934	*6940–6984*
Upper East Branch	July 12, 1934	*6985–7007*
East Branch, near limit of trees	July 21, 1934	*7008–7061*
"	Aug. 19, 1934	*7255–7279*
Reindeer Station	Aug. 10, 1934	*7211–7228*
" in a lake	Aug. 4, 1934	*7229–7249*
"	Aug. 18, 1934	*7250–7254*
"	Aug. 18, 1934	*7280–7299*
Lower East Branch	Sept. 10, 1934	*7300–7301*
"	Oct. 2, 1934	*7364–7371*
Reindeer Station	May–July, 1935	*7372–7380*
Lower East Branch	July 3–5, 1935	*7381–7397*
Mouth of West Branch	Sept. 16, 1933	*6923–6924*
Lake between East Branch & Eskimo Lake	Nov. 1, 2, 1933	*6930–6939*
South end of Richards Isl., 69° N.	July 22, 1934	*7062–7080*
"	July 18, 1927	*2029–2130*
North end of Richards Isl., 69° 30′ N., 134° W.	July 22–24, 1927	*2131–2296*
"	July 26, 1935	*7448–7455*
Hendrickson Isl.	July 26, 1935	*7456–7463*
Kendall or Garry Isl.	December, 1927	*3185–3187*
Kittigazuit, 69° 22′ N., 133° 40′ W.	July 19, 20, 1927	*2297–2411*
Fish camp east of Kittigazuit	July 24–28, 1927	*2412–2530*
ARCTIC COAST, between Mackenzie and Anderson Rivers		
Tuktuayaktoq (Pt. Hearne)	July 25, 1935	*7402–7447*
Atkinson Pt., 70° N., 131° 20′ W.	Aug. 1–3, 1927	*2531–2681*
Cape Dalhousie, 70° 20′ N., 129° 55′ W.	Aug. 7–14, 1927	*2682–2812*
Liverpool Bay, 70° N., 129° W.	Aug. 15, 16, 1927	*2813–2951*

Place and location	*Date*	*Serial Numbers*
ESKIMO LAKE BASIN		
Kugaruk, entrance to Lakes	Aug. 31, 1927	*3077–3095*
2nd Lake, west end	Aug. 19, 1927	*2952–3018*
Narrows between 3rd & 4th lakes	Aug. 20, 1927	*3019–3076*
Setidgi Lake	Aug. 21, 22, 1927	*3096–3180*
MACKENZIE RIVER		
Bear Rock, below Norman	July 23, 1928	*3375–3399*
Ramparts above Good Hope	Sept. 19, 1928	*3402–3405*
"	Sept. 25, 1928	*7472–7473*
Mackenzie R. between 62° 20′ and 65° 40′ N.	Sept. 17–27, 1931	*6561–6573*
GREAT BEAR LAKE		
Bear River	June 15, 1928	*3238–3274*
Mt. Charles	July 16, 1928	*3275–3321*
"	Sept. 2, 1928	*3322–3370*
Keith Arm, Ft. Franklin	May 11–June 13, 1928	*3188–3237*
" Russel Bay	Aug. 26–28, 1928	*3407–3467*
Etacho Point, 1500′ elev.	Aug. 24, 1928	*3468–3524*
Smith Arm: north shore	July 16–26, 1928	*5054–5087*
Dease Arm: north shore	June 23–26, 1928	*4661–4730*
Barrens near headwaters of Horton River	June 19–21, 1928	*4731–4751*
Foot of Dease Arm	June 7–Aug. 1, 1928	*4752–4882*
North shore	June 27–July 22, 1928	*4883–5053*
Cape McDonnel	Aug. 1, 1928	*5088–5164*
McTavish Arm: north shore	Aug. 4–6, 1928	*5165–5252*
Head of Edna Travers Bay	Aug. 8, 1928	*5253–5285*
East coast	Aug. 8–11, 1928	*5286–5350*
Southern portion	Aug. 13–21, 1928	*3599–3786*
Leith Point	Aug. 23, 1928	*3525–3598*
Miscellaneous small collection	1928	*6182–6200*
KEEWATIN DISTRICT		
Lake on Tha-anne R., 60° 58′ N., 97° W.	July 12, 13, 1930	*5544–5607*
West Coast of Hudson Bay, Mistake Bay, 62° 05′ N.	July 20–29, 1930	*5608–5730*
Yathkyed Lake on Kazan R., 62° 30′–63° N., 97°–98° 30′ W.	Aug. 1–15, 1930	*5731–5861*
Lower Kazan R.	Aug. 16–26, 1930	*5992–6074*
Baker Lake, 64° 30′ N., 97° W.	Sept. 2, 3, 1930	*6075–6129*
Chesterfield	Sept., 1930	*6130–6175*
MISCELLANEOUS COLLECTIONS		
Chesterfield Inlet, *Dr. Currie* (Polar Year Exp.)		*1–72*
Yellow Knife Reserve, 63°–64° N., 109°–114° W., 1936, *John Carroll*		*1–25*
Barrens between Backs and Thelon R., 64° 20′ N., 104° W., *John Carroll*		*26–67*
Thelon Game Sanctuary, 1936, *C. H. D. Clarke*		*1–116*
Coppermine R., 1931, *A. M. Berry*		*1–28*
Foothills west of Mackenzie Delta, 1931, *O. Bryant*		*unnumbered*

The symbols mentioned below indicate the herbaria in which the specimens cited were seen. Where no symbols are appended, the specimens are in the National Herbarium of Canada.

C—Herbarium of the University of Copenhagen, Denmark
Can—Herbarium of the National Museum of Canada, Ottawa
G—Gray Herbarium, Harvard University, Cambridge, Mass.
NY—Herbarium of the New York Botanical Garden, New York, N. Y.
US—United States National Herbarium, Washington, D. C.

The families and genera are arranged essentially according to Dalla Torre and Harms, Genera Siphonogamarum (1900–1907). Within the genera the

species, for the sake of convenience, are arranged alphabetically, except in the genus *Carex,* where the arrangement followed is that of Mackenzie in N. Am. Flora 18 (1935).

EQUISETACEAE

Equisetum palustre L.

Mackenzie River Delta: Aklavik, *3181;* Great Bear Lake: North shore of Smith Arm, *4981;* McTavish Arm, Conjuror Bay, *4858.*

Recorded by Richardson "to the shores of the Arctic Sea," but not otherwise known from the Northwest Territories.

SELAGINELLACEAE

Selaginella selaginoides (L.) Link.

Great Bear Lake: Keith Arm, Russel Bay, *3416, 3433;* south shore, Leith Pt., *3563;* Dease Arm, north shore, *4662.*

New to the flora of the Northwest Territories.

Selaginella sibirica (Milde) Hieron.

Richardson Mts.: East slope, west of Mackenzie Delta, about 68° N., 2000–4000′ elev., *6633, 6746;* Mackenzie River Delta: East Branch, 68° 40′ N. to 68° 55′ N., *6559, 6574, 7008;* south end of Richards Isl., *2031.*

New to the flora of the Northwest Territories and not previously recorded from north of Lake Athabaska.

ISOËTACEAE

Isoëtes Braunii Dur.

Great Bear Lake: McTavish Arm, (plants with mature macrospores) *3688.*

In the Mackenzie Basin *I. Braunii* was previously collected on Lake Athabaska (*Raup & Abbe 4617*). It is thus new to the flora of the Northwest Territories.

POTAMOGETONACEAE

Potamogeton pectinatus L.

Mackenzie River Delta: Lake near the East Branch, 68° 40′ N., *6913, 6915, 7244.*

The last number, collected on Aug. 11, 1934, has immature fruit, showing that in the Mackenzie Delta the species produces fruit at least in favorable seasons. *Potamogeton pectinatus* in Canada was known previously north to Lake Athabaska.

SPARGANIACEAE

Sparganium angustifolium Michx.

Eskimo Lake Basin: Setidgi Lake, *3097, 3173* (the last with mature fruiting heads); Great Bear Lake: McTavish Arm, *5334.*

Sparganium simplex, in Hook. Fl. Bor.-Am. 2: 169. 1839, "to Ft. Franklin," may belong here, but otherwise the species has not been previously recorded from north of Great Slave Lake.

Sparganium hyperboreum Laest.

Mackenzie River Delta: West Branch (Husky River), *7316;* Eskimo Lake Basin: *2954, 3059, 3125;* Great Bear Lake: *3434, 4983, 5056;* Keewatin Distr.: Yathkyed L., *5732, 5998;* Tha-anne R., *5550;* Churchill, Mosquito Pt., *5521.*

Apparently common and in favorable seasons maturing fruit north to, or slightly beyond, the limit of trees.

Sparganium eurycarpum Engelm.

Mature fruiting heads were collected by the writer on the Mackenzie River, near Ft. Norman, in September, 1928. In the Mackenzie basin not previously recorded from north of Lake Athabaska.

SCHEUCHZERIACEAE

Triglochin maritima L.

Mackenzie River Delta: Campbell L., *1899;* Kittigazuit, *2301;* Great Bear Lake: *3261, 3671, 4664, 5089, 5165.*

Triglochin palustris L.

Mackenzie River Delta: Recorded in many places (A. E. Porsild, field notes); Great Bear Lake: *4664A, 4785, 5166;* Keewatin Distr.: Mistake Bay, *5612.*

The above numbers represent the first collections from the Mackenzie basin north of Great Slave Lake, and the first from Keewatin District.

GRAMINEAE

Beckmannia Syzigachne (Steud.) Fern.; Raup in Jour. Arn. Arb. **17**: 209. 1936.

Beckmannia erucaeformis R. & S.; Richardson in Franklin's Journ. App. 731. 1823.

Although Richardson apparently collected this plant, Hooker, Fl. Bor.-Am., has not included it. Richardson does not give any stations but merely lists it under "W" ("wooded country from latitude 54° to 64° north"), and Raup's, l. c., seems to be the first specific record from the Northwest Territories (*Miss E. Taylor 30099* [Can], Ft. Simpson). Along the lower Mackenzie River, *B. Syzigachne* occurs sporadically near settlements as a weed introduced from the upper river with native hay shipped north with livestock. In the Mackenzie Delta, in addition, there occurs a plant which apparently is indigenous, but of a very curious local distribution. It inhabits muddy shores of certain shallow, stagnant lakes flooded during the early part of the season. But even in such places its occurrence is sporadic (Mackenzie River Delta: East Branch, *6898* and *7235*). The seeds are eagerly eaten by wild ducks, and the fact that the plant grows in places frequented by these birds suggests that the latter distribute the seeds. Were the seeds carried by flood water the distribution would, no doubt, be more general.

Schizachne purpurascens (Torr.) Swallen.

Great Bear Lake: McTavish Arm, Conjuror Bay, *3643.*

New to the flora of the Northwest Territories.

Muhlenbergia Richardsonis (Trin.) Rydb.

Great Bear Lake: Bear River, *3357.*

New to the flora of the Northwest Territories.

Calamagrostis chordorrhiza sp. nov.

Gramen perenne laxe caespitosum, rhizomatibus longis sublignosis subnitidis perramificatis; culmi ascendentes aut geniculati, 30–35 cm. alti, omnino scabri, solitarii aut aggregati, phyllopodici, binodosi; folia inferiora caulina numerosa, aggregata, brevia, laminis planis latisque instructa, superioribus angustioribus valde reductis; folia axium sterilium numerosa, in fasciculis foliosis conferta, culmo maturo dimidio breviora; lamina 3 mm. lata, plana, marginibus parce involutis abrupteque acuminatis, glauca, utrinque scaberrima; ligula triangularis, 2 mm. longa, erosa; panicula laxa angusta, 5–6 cm. longa et 1–1.5 cm. lata, ± interrupta; rami breves hispidissimi, inferioribus remotiusculis; glumae aequales, 2.5–3 mm. longae, acuminatae vel fere cuspidatae, parum purpuras-

centes; carina subhispida, marginibus vix puberulens, marginibus angustis pellucidis instructa; flosculus 2–2.3 mm. longus, lemmae firmiusculae infra virides, apicibus stramineis, arista recta vel rarissime subgeniculata, quam lemma quinto minor, evidenter infra medium orta, palea pellucida, lemmam aequans; pili ad basim paleae inaequales, copiosi, longissimi aequi ac lemma tantum longi; rhachillae nodo brevissimo.

MACKENZIE RIVER DELTA: East Branch, 68° 40′ N., hills back of Government Reindeer Station, forming large cushions in sandy soil, Aug. 7, 1932, *A. E. Porsild 6524* (TYPE). Thus far known only from the type locality.

Calamagrostis chordorrhiza, because of its small spikelets and small, straight awn, may be related to *C. neglecta* (Ehrh.) Gaertn., while its very scabrous and glaucous leaves and strong rhizomes are somewhat suggestive of *C. purpurascens.* Our plants are late-flowering but the floral parts appear quite normal and do not suggest hybrid parentage. By its fascicles of flat, crowded and glaucous leaves and strong, cord-like rhizomes, *C. chordorrhiza* seems so well-marked from all other species of *Calamagrostis* known to the writer that he can see no other alternative than to consider it undescribed.

Calamagrostis deschampsioides Trin.

Although Polunin (in Nat. Mus. Can. Bull. **92**: 50. 1940) was the first to record this species from Canada, the writer and his brother, in 1927, collected it in the Mackenzie Delta (north end of Richards Island, July 22–24, 1927, *2136, 2137;* Arctic Coast: Atkinson Point, *2558*). In the writer's collection also are specimens from Churchill, Man., *5378.*

Calamagrostis lapponica (Wahlenb.) Hartm. var. **nearctica** var. nov.

Calamagrostis lapponica (Wahlenb.) Hartm.; Britton & Rydberg in Bull. N. Y. Bot. Gard. 2: 154. 1901.

Calamagrostis canadensis var. *Langsdorffii* sensu Porsild in Rhodora **41**: 179. 1939, pro min. parte, non Link.

A specie differt statura semper minore (35–50 cm. neque 50–120 cm.), panicula breviore angustiore (4–8 cm. neque 5–15 cm.), glumis parum brevioribus angustioribusque (4 mm. neque 5 mm.).

The writer, in 1927 and 1928, collected in various parts of the Mackenzie District what he then took to be a slender form of *C. canadensis* var. *Langsdorffii.* From 1932 to 1935, when he was a resident of the Mackenzie Delta, this plant was grown from seed in its natural habitat and also studied in the field. It was realized then that the plant did not belong with the polymorphous *C. canadensis,* and he at first thought it to be an undescribed species widely distributed in arctic and subarctic parts of Northwest America, since clearly it could not be referred to any American species. Comparison with European and Asiatic species has shown, however, that it must be referred to *C. lapponica* (Wahlenb.) Hartm., although it differs so consistently from that species in size that it seems best treated as an American (?and E. Asiatic) race or variety. The following is a more detailed description.

Loosely caespitose with short, thin rhizomes; culms solitary or few together, slender, erect, 30–60 cm. high, glabrous except just below the panicle, with 2 or 3 nodes, the cauline leaves strongly involute; leaves about half as long as the mature culms, about 2 mm. wide, flat, or more often strongly involute, essentially glabrous; ligule short and entire, almost truncate, 1.5–2 mm. long, sometimes tinged with purple; panicle lax, suffused with purple, narrow to somewhat open, 4–6–8 cm. long and 1.5, rarely 2, cm. wide, the branches very hispid, the

longest 2.5 cm. long; glumes 4–4.5 mm. long, slightly lustrous and strongly suffused with purple, with stramineous margins and tips, abruptly acuminate, hispidulous-scabrous on the keel and sparsely scabrous on the sides; floret 3.6–3.7 mm. long, the lemma truncate, 7-nerved (counting mid-nerve, which is wanting above the base of the awn), scabrous except at the hyaline summit; awn arising ⅓ from the base, erect, straight or rarely slightly bent in the lower half, barely equaling the lemma; palea 2.7 mm. long, erose-truncate, the margins and upper half hyaline, the nerves scarcely reaching to the apex; callus hairs unequal, the longest nearly as long as the lemma; rhachilla joint 1 mm. long, its hairs copious, as long as the lemma, a few slightly longer.

In old sand dunes or in peaty soil or in open heath and muskegs, on the arctic coast from Norton Sd., Alaska, east to Hudson Bay, south to Great Bear Lake and mountains of central Yukon and Alberta.

MACKENZE RIVER DELTA: East Branch, 68° 40′ N., two-year-old plants grown from seed (collected with specimens of no. *6525*), Aug. 12, 1934, *A. E. Porsild 7282* (TYPE). *Calamagrostis lapponica* var. *nearctica,* in addition, is represented by the following specimens in the National Herbarium of Canada: ALASKA: Norton Sd., Pastolik, *955* (distributed as *C. canadensis* var. *Langsdorffii*); YUKON TERRITORY: Lake Kluane to Don Jek River, Aug. 11–27, 1920, *Adolf Müller* (distr. as *C. scabra* Presl); Klondike, Indian Divide, *John Macoun 54626* (distr. as *C. neglecta* Ehrh.); same place, *John Macoun 54627* (distr. as *C. canadensis* Michx. var. *acuminata* Vasey); MACKENZIE DISTRICT: Mackenzie River Delta, East Branch, 68° 40′ N., solitary culms in dry heath, Aug. 7, 1932, *6525* (TOPOTYPE); Eskimo Lake Basin, north shore of 2nd lake, low, marshy tundra, *2959, 2960;* Great Bear Lake, Keith Arm, Russel Bay, open willow thickets, *3408;* same place, sand dunes along lake shore, *3419;* KEEWATIN DISTRICT: Yathkyed L. on Kazan River, dry hillsides, *5738;* Baker Lake, *A. Dutilly 4513* (distr. as *C. purpurascens*); Chesterfield, west coast of Hudson Bay, dry tundra, *6132.* The following, from high mountains of Alberta, differ chiefly in slightly smaller (3 mm.) and more glabrous glumes: ALBERTA: Mountain Park, Mt. Harris, 7000 ft. elev., Aug. 13, 1925, *Malte & Watson 2134, 2153;* back of "Miner's Roof," 6000 ft. elev., Aug. 11, 1925, *Malte & Watson 2017.*

Calamagrostis lapponica var. *nearctica* may be distinguished from all other N. American species of *Calamagrostis* by its narrow, lax panicle, which is strongly suffused with purple, its short and often involute leaves, and by its solitary culms, its long callus hairs, and straight awn. On the other hand it is a good match for *C. lapponica,* Fl. Dan. Suppl. 1, *tab. 5* (1853), as well as for specimens in the National Herbarium of Canada thus labeled, exemplified by: "Pl. Finl. Exsicc. No. 456, Lapponia Kemensis, Aug. 2, 1913, leg. U. Segerman" and "Montes uralenses septentrionales (lat. bor. inter 64° et 65°), July 27, 1927, leg. V. Soczava, no. 386," but it is consistently smaller than the plant called for in the original description as well as the plant described by modern European authors such as Holmberg (Skandinaviens Flora **1**[1]: 153. 1932) and Roshevitz (in Komarov, Fl. U. R. S. S. **2**: 219. 1934). The former gives the following extra-Scandinavian distribution: "N. Russia; Siberia; N. America; Greenland." Holmberg's American record may be based upon a note by Fernald in Rhodora (**13**: 123. 1911), and the Greenland one undoubtedly refers to *C. lapponica* Hartm. var. *groenlandica* Lange (Conspectus Fl. Groenlandica **2**: 296. 1887), which is *C. hyperborea* Lange.

Calamagrostis lapponica has from time to time been recorded from North America (Britton & Rydberg, l. c.; Rhodora, l. c.; St. John in Vict. Memorial Mus. Mem. **126**: 64. 1922; Stebbins in Rhodora **32**: 56, *tab. 195, fig. 9.* 1930; Victorin, Fl. Laurentienne 792. 1935), but all but the record of Britton and Rydberg seem very doubtful, and all plants thus labeled, seen in America her-

baria by the writer, seem best referred to *C. neglecta* (Ehrh.) Gaertn. or to *C. hyperborea* Lange. Certainly *C. lapponica* var. *brevipilis* Stebbins (Rhodora, l. c.) should be referred to *C. neglecta* (Ehrh.) Gaertn.

In his revision, Stebbins, l. c., appears to have overlooked the plant noted as *C. lapponica* (Wahlenb.) Hartm. by Britton and Rydberg, l. c., from the Yukon. Their description and discussion clearly show that their plant is *C. lapponica* var. *nearctica,* and it thus appears that theirs is the first authentic record of *C. lapponica* from North America.

Trisetum sibiricum Rupr.

Trisetum flavescens Ostenf. in Gjöa Exp. 32. 1910.

Ostenfeld, l. c., "with some doubt," recorded this species from King Point on the Arctic coast of Yukon Territory, stating that the specimens were very poor and much too young. The writer succeeded in finding mature specimens, probably in the identical place: Between King and Kay Points, 69° 12′ N., 138° 30′ W., July 23–25, 1934, *7122*.

Poa ammophila sp. nov.

Gramen perenne dense caespitosum, rhizomate brevi colonias densas compactas formante; culmi 20 cm. raro 35 cm. alti, erecti vel parum ascendentes, rigidi, perglabri, folia circa duplo superantes, foliis 1 aut 2 in parte inferiore muniti; folia glabra, cinereo-viridia rigida, involuto-conduplicata; vaginae subinflatae, persistentes, nitidiusculae, ligula acuminata, circa 1.5–2 mm. longa; panicula etiam tempore anthesi angusta, circa 4 cm. longa et 0.5–0.8 cm. lata, ramis brevibus appressisque, glabris vel scabriusculis; spiculae circa 6 mm. longae, plerumque triflorae, haud conspicue compressae; glumae aequales, circa 4 mm. longae, strictae, carinatae, parte superiore tertia glabrae aut subscabrae, subnitidae, purpurascentes, margine late scariosae, acuminatae; lemmae circa 3.5 mm. longae, forma glumas simulantes, dorsaliter brevi-pubescentes, basi haud ciliata obscure uninervatae, membranaceae; antheris circa 1.4 mm. longis.

Arctic Coast: Cape Dalhousie, 70° 20′ N., 125° 55′ W., forming colonies on sandy hills back of coast, Aug. 7–14, 1927, *2704* (type); 6 miles east of Kittigazuit, *2422;* Cape Dalhousie, a luxuriant form 35 cm. tall, *2706;* Liverpool Bay, *2827;* Mackenzie River Delta: North end of Richards Isl., *2154;* Kittigazuit Island, *2311.* In no. *2827* the spikelets are less flattened, the glumes are shorter and less prominently keeled, and the ligule is somewhat shorter than in the type. *Poa ammophila* is a characteristic plant of old sand dunes and sandy hilltops along the arctic coast from the Mackenzie Delta east to the mouth of Anderson River.

Poa ammophila superficially resembles *P. Hartzii* of Greenland, recently, with some doubt, reported also from Ellesmere Island (Polunin in Nat. Mus. Can. Bull. **92**: 69. 1940), but the abundant material on hand all differs from it in the much shorter ligules and the much shorter and less abundant pubescence of the lemmas. In fact it seems very close to some Cordilleran species, and, following Rydberg, Fl. Rocky Mountains, it seems best placed in the section *Rupicolae,* where it most closely matches *P. Pattersoni* Vasey. This, however, is said to have a short, truncate ligule. Except that the glumes are longer than the lemmas, it matches the original description of that species and also a specimen from the type locality: Gray's Peak, Colorado, 13,000 ft., Aug. 15, 1885, *G. W. Letterman* (Can). It is also a close match for *Poa Suksdorfii* Vasey, Mt. Rainier, Wash., Aug. 14, 1895, *O. D. Allen 183* (Can). Our plant, however, is a good deal taller and also differs so much from half a dozen other sheets in the National Herbarium of Canada named *P. Pattersoni* by Rydberg and others that the writer hesitates to refer it to that species.

Festuca altaica Trin.

RICHARDSON MTS.: West of Mackenzie Delta, 68° N., 3000–4000′ elev., *6636;* GREAT BEAR LAKE: Dease Arm, *4667;* north shore of Smith Arm, *5070;* ARCTIC COAST OF YUKON TERRITORY: Near Shingle Pt., *6902, 7083.*

New to the flora of the Northwest Territories.

Agropyron latiglume (Scribn. & Merr.) Rydb.

Agropyron alaskanum Scribn. & Merr., Macoun & Holm in Rept. Can. Arct. Exp. **5A**: 8. 1921.

Occasional in sandy or somewhat peaty soil from the mountains west of the Mackenzie Delta, east along the Arctic Coast and on islands of the Arctic Archipelago; Kazan River, south of Baker Lake (no. *6000*), and south to Great Bear Lake and the east end of Great Slave Lake. Also in Yukon Territory and Alaska.

Agropyron trachycaulum (Link) Malte.

MACKENZIE RIVER DELTA: East Branch, 68° 40′ N., *6519;* south end of Richards Isl., *2048;* 6 miles east of Kittigazuit, *2416;* GREAT BEAR LAKE: Dease River valley, *4864;* north shore of Smith Arm, *5067;* north shore of McTavish Arm, *5195.*

Agropyron trachycaulum in its distribution is more southern than *A. latiglume* and in the Northwest Territories does not reach far beyond the limit of trees. It seems always restricted to alluvial soils. On clay banks of the East Branch of the Mackenzie Delta it forms large, firm tussocks, one meter or more in diameter and often 1.25 m. high, and has spikes 16 cm. long.

Our material is all rather uniform. The lemmas are pubescent with a short awn and the sheaths are glabrous. According to Malte's revision (Ann. Rep. Nat. Mus. Can. **1930**: 48. 1932) this would place it with var. *pilosiglume* Malte, known only from the type locality, Vancouver Island, B. C., which somehow does not make sense.

Elymus innovatus Beal.

Elymus mollis R. Br., sensu Hook. Fl. Bor.-Am. **2**: 255. 1840, not Trin., at least in part.

RICHARDSON MTS.: Foothills west of Mackenzie Delta, *6634;* MACKENZIE RIVER DELTA: E. Branch, 68° 40′ N., *6501, 6521;* MACKENZIE RIVER: Bear Rock, 1300′ elev., *3375;* GREAT BEAR LAKE: Bear River, Mt. Charles, *3324.*

A western species restricted to calcareous soils of the interior; in the Mackenzie country it barely reaches north to the limit of trees.

CYPERACEAE

Eriophorum callitrix Cham.

Since Fernald (in Rhodora **27**: 203–210. 1925) cleared up the true identity of *E. callitrix* and its distribution in North America, our knowledge of the known range of this plant has been enormously increased. Polunin's prophetic statement (l. c., 102) that "when explorers have learned to overlook it less it may prove circumpolar" may indeed some day come true. It has already turned up in East Greenland, and its discoverer, G. Seidenfaden, with Th. Sørensen, has since published a paper on the geographical distribution of it and allied species (Medd. om Grønland **101**[1]: 1–27. *tab. 1, 3,* 1933). To the latest new stations in Alaska recently given by Porsild (in Rhodora **41**: 199. 1939) and in the Eastern Arctic by Polunin, l. c., should be added the following:

RICHARDSON MTS.: West of Mackenzie Delta, 2000–3000′ elev., *6639;* GREAT BEAR LAKE: Foot of Dease Arm, *4753;* north shore, Haldane R., *5026;* KEEWATIN DISTR.: Tha-anne R., 60° 58′ N., 97° W., *5570;* JAMES BAY: S. Twin Isl., *4205.* Also, in the Gray Herbarium, is a specimen from Montana: Custer National Forest (*L. O. Williams 3706*). *E. callitrix* appears to be restricted to calcareous soils.

Eriophorum medium Anders.

MACKENZIE RIVER DELTA: East Branch, *6958;* S. end of Richards Isl., *2050;* KEEWATIN DISTR.: Tha-anne R., *5570B;* Yathkyed Lake, *5755, 5756;* Kazan R., *6018.*

Eriophorum opacum (Bjørnstr.) Fern.

MACKENZIE RIVER DELTA: Peel R., above Aklavik, *7400;* Campbell Lake, *1885.*

Eriophorum opacum in the north is the latest-flowering species in this genus and is confined to muskeg forest. Its range is decidedly more southern than that of the other caespitose species. Where Seidenfaden and Sørensen, l. c., give the world range of *E. opacum,* the reader is astonished to find that among other stations under the heading "Arctic America" are "Hastings County, Ontario and Prince Albert, Sask.," and that Churchill, Manitoba, has been placed in the Northwest Territories. In fact the reader might easily be misled to believe, with Seidenfaden and Sørensen, that the American range of *E. opacum* is arctic.

Eriophorum vaginatum L.

The true *E. vaginatum* of Eurasia is a very common species in the northern parts of the Mackenzie District, where it is a dominant species in "climax" tundra. The species in the Mackenzie Delta flowers late in May. Late snow or rain during anthesis may completely ruin the season's seed crop; but otherwise, during late July, large tracts of land, or sometimes the entire landscape, turn completely white as if covered with snow. Heads composed entirely of pistillate flowers are as common as the normal bisexual ones. The anthers are from 2.1 to 2.6 mm. long, the achenes flat-trigonous, almost black, 2–3 mm. long, and 2 mm. wide.

East of the Mackenzie Delta *E. vaginatum* becomes progressively less ubiquitous, and at Great Bear Lake it no longer dominates. It is still less common in Keewatin District and east of Hudson Bay, and in the southern parts of the Mackenzie District it is replaced by the very closely related *E. spissum* Fern.

Eleocharis acicularis (L.) R. & S.

MACKENZIE RIVER DELTA: Forming masses of vegetation in nearly all lakes (var. *submersa* (Hj. Nilss.) Svenson), while the fertile plant grows abundantly on wet, muddy shores; East Branch, *6918, 7236, 7410,* the last number fertile and grown in the writer's garden on the East Branch from seed; ARCTIC COAST: East of Kittigazuit, *2452* (var. *submersa*); same place, *2432* (fertile); GREAT BEAR LAKE: Dease Arm, *4669, 4789;* Smith Arm, *4987;* McTavish Arm, *3691;* KEEWATIN DISTR.: Yathkyed Lake on Kazan R., *5749* (fertile), *5750* (var. *submersa*); Lower Kazan R., *6019;* Baker Lake, *6180* (sterile); Mistake Bay, west shore of Hudson Bay, *5623* (sterile).

Not previously recorded from north of Great Slave Lake.

Eleocharis palustris (L.) R. & S.

GREAT BEAR LAKE: North shore of Dease Arm, *4668;* Great Bear River, *3376.*

Previously recorded from Bear Lake by Richardson.

Eleocharis pauciflora Link.

GREAT BEAR LAKE: North shore, Haldane R., *4914;* Dease Arm, *4670;* Smith Arm, *4987A;* McTavish Arm, *5170;* south shore, Leith Pt., *3529.*

Not previously recorded from north of Great Slave Lake.

Scirpus validus Vahl.

MACKENZIE RIVER: Near Ft. Norman, *5367.*

Only record north of Great Slave Lake.

Kobresia caricina Willd.

Kobresia bipartita (All.) Dalla Torre.

Common or occasional in rather dry tundra and represented by many numbers in the writer's collection, from the Mackenzie Delta east to Hudson Bay. Not previously collected north of Great Slave Lake.

Kobresia arctica sp. nov.

Planta densissime caespitosa, colonias parvas sed compactissimas formans raro 15 cm. diametro superantes; rhizomata brevissima, ascendentia, crassa, non-stolonifera; culmi 12–35 cm. alti, flavo-virides, rigidi, obtusanguli, leves, maturi folia multum superantes, phyllopodici vaginis annorum praecendentium siccis persistentibus valde obviis; folia erecta, longe attenuata, opaca viridia, angusta, valde canaliculata, facie teretia, marginibus parte tertia inferiore scabriusculis; vaginae opacae castaneae; spica solitaria, ovata vel ellipsoidea, ebracteata, 1–1.8 cm. longa ac 0.5–0.8 cm. lata; spiculae circa 20, unaquaque florem masculum simul cum foemineo continente duobus infimis exceptis in rhachillis vestigialibus impositis, flores 2 vel 3 foemineos, masculum 1 continentibus; squamae persistentes, late ovatae, obtusae, opacae, obscure castaneae centro pallidiores, marginibus angustis pellucidae; nuculae 3–4 mm. longae, utriculis chartaceis persistentibus breviores, obovoideae, obvie triangulares, pallidae brunneo-cinereae, glabrae, opacae, enervosae, brevistipitatae fere erostres; stylus tenuis nuculam subaequans; stigmatibus 3.

In rather dry, peaty tundra from mountains west of the Mackenzie River east to Back's River and south to Great Bear Lake. Also islands of Bering Sea and in eastern Siberia (?).

MACKENZIE RIVER DELTA: Kittigazuit Island, 69° 22′ N., 133° 40′ W., common in dry tundra, July 19, 20, 1927, *A. E. & R. T. Porsild 2318* (TYPE); RICHARDSON MTS.: West of Mackenzie River Delta, in peaty soil, alpine tundra, 3000′ elev., approx. 68° N., 136° W., *6757;* ARCTIC COAST OF YUKON TERRITORY: *7125;* MACKENZIE RIVER DELTA: Mainland near reindeer corrals, *7381;* Hendrickson Isl., *7456;* Kittigazuit Isl., *7371;* north end of Richards Isl., *2159;* ARCTIC COAST: Atkinson Pt., *2562;* Cape Dalhousie, *2712;* Liverpool Bay, Nicholson Isl., *2834;* GREAT BEAR LAKE: North shore of Dease Arm, low tundra, *4884;* Keith Arm, Russel Bay, *3421;* Cape McDonnel, *5101;* MACKENZIE DISTR.: South of Back's River, 64° 30′ N., 104° 20′ W., July 28, 1936, *J. Carroll 27.* The above are all in the National Herbarium of Canada. In addition the writer has seen a specimen in the Gray Herbarium, collected by the United States North Pacific Exploring Expedition in 1853–56, labelled "*Elyna caricina* Mert. & Koch, Arakamtchetchene Island, Behring Straits, C. Wright coll." This appears to match our material, although an uninitialed note on the sheet, presumably by Mackenzie, says: "*Kobresia caricina.*"

Kobresia arctica is perhaps most closely related to *K. macrocarpa* Clokey, of alpine peaks in Colorado, which, however, is well-marked from ours in having "the terminal flowers staminate and the lateral pistillate" and by having leaves that equal or exceed the culm. *Kobresia schoenoides* of alpine Eastern Asia is a much more robust plant with culms 35 to 50 cm. tall and with very conspicuous and shiny old sheaths. One sheet at Copenhagen thus named, and labelled "Pl. lenensis subarcticae, Sib. Jakutsk, Bulkur 72°, Sept. 1898, Herm. Nilsson," is much taller than our plant but otherwise seems closer to *K. arctica* than to *K. schoenoides.*

Carex nardina Fries var. **Hepburnii** (Boott) Kükenth. in Pflanzenr. 38(IV. **20**): 70. 1909.

Carex Hepburnii Boott in Hook. Fl. Bor.-Am. **2**: 209, *tab. 207.* 1839; Mackenzie in N. Am. Flora **18**: 22. 1931, *tab. 2.* 1940.

Boott's name was based upon a plant from the Canadian Rocky Mts. and was published a few months after Fries had described his *C. nardina,* based upon material from Greenland. Boott, however, had seen specimens of the Greenland plant sent to him by Hornemann, for under the distribution of *C. Hepburnii* he added "Greenland, Horn. in herb. Hooker." In the National Herbarium of Canada there is a duplicate from Boott's herbarium labelled "C. nardina Fries—C. Hepburnii Boott—Greenland." Boott, nevertheless, could not have

known the Greenland plant very well, for he does not compare the two and his description of *C. Hepburnii* is in such general terms that it applies almost equally well to *C. nardina*. The details of his plate, however, leave no doubt as to the identity of his *C. Hepburnii,* whereas the drawing of the plant itself is not characteristic of that species. It is easy to understand, therefore, that the critical student of *Carex,* S. Drejer (Revis. Crit. Caric. 437. 1841) reduced *C. Hepburnii* to synonymy, although it is worth noting that in the discussion he remarks "Figura cl. Boottii bene habitum nostrae planta C. nardina exprimit, sed descriptio perigynii et analyses depictae non satis correctae." Steudel (Syn. Pl. Cyp. 184. 1855) followed Drejer, while much later Kükenthal (Pflanzenreich 38 (IV. 20) : 70. 1909) took up Boott's name as a variety of *C. nardina* but reserved it for the plant of the mountains of Pacific N. W. America. At the same time he gave a brief but good description of the plant. Rydberg (Fl. Rocky Mts. 119. 1917), giving as a synonym *C. stantonensis* Jones, and others have applied *C. Hepburnii* to the plant of western America, excluding *C. nardina* altogether.

Here, then, the matter rested until Tengwall (Sv. Bot. Tidskr. **10**: 543. 1916), in reporting *C. Hepburnii* from northern Scandinavia, started a lot of trouble. Ostenfeld (Medd. om Grønl. **54**: 164. 1923), having carefully examined a large number of plants of what had heretofore been considered good *C. nardina* from arctic Europe and Greenland, decided that Tengwall was essentially right and that a number of plants from Lapland, Spitsbergen, Greenland, and N. E. America should be separated from *C. nardina;* but he concludes: "I feel it impossible to keep the two forms as distinct species." This is not surprising, since neither Tengwall nor Ostenfeld had seen specimens of true *C. Hepburnii,* and the plant they had in mind and which a number of subsequent writers have accepted as *C. Hepburnii* is actually *C. nardina* var. *atriceps* Kükenth. (in Rep. Sp. Nov. **8**: 7. 1910), based upon specimens from West Greenland; of this Kükenthal, l. c., says: "Diese Varietät steht zwischen der typischen Form und der nordamerikanischen var. *Hepburnii* (Boott) Kükenth." This very clearly is Tengwall's plant, of which the writer has a duplicate from the original collection and which Tengwall illustrates, l. c., *fig. 4* (left).

That *C. "Hepburnii"* of Tengwall and Ostenfeld cannot be maintained as specifically distinct from *C. nardina* has been made abundantly clear by Scholander (Skr. om Svalbard, No. **56**: 121. 1933, and **62**: 58–62. 1934), who even goes a step farther and, perhaps prejudiced by his personal experiences with the "false" *C. Hepburnii,* questions the existence of a "real" one. Having seen no authentic material of *C. Hepburnii,* he is not convinced by Mackenzie's treatment, l. c., and, after citing Mackenzie's key, concludes: "characteristics here enumerated [seem] to be extremely vague and in both instances very variable tendencies which are without any firm inter-coupling."

True *C. Hepburnii* is poorly represented in most herbaria; even in the Gray Herbarium there are but a few sheets. Therefore, in the absence of authentic material, it is easy to understand why so many recent writers, including Polunin, l. c., although he admits to having seen Scholander's treatment, have been misled by Tengwall and Ostenfeld. The two varieties of *C. nardina* may be distinguished thus:

	C. nardina and var. *atriceps*	var. *Hepburnii*
spike:	ovoid-orbicular	ovate-oblong
staminate part:	not conspicuous	conspicuous
pistillate scales:	dark, with pale midvein only	conspicuous light center
perigynia:	distinctly short-stipitate	tapering below, not conspicuously stipitate
sheaths:	gradually tapering into blade	abruptly contracted into blade

Distribution: *Carex nardina* and its var. *atriceps:* Extreme northern Europe, Spitsbergen, Iceland, E. and W. Greenland, eastern North America from Ellesmere Island south to Gaspé, Que., west to Hudson Bay and to mountains of western America; not in the Mackenzie District and probably not in Alaska. *Carex nardina* var. *Hepburnii:* Mountains of Alberta, British Columbia, and Washington, north to Alaska and ? Yukon; doubtful in Colorado.

Unfortunately the matter is still further complicated by the presence of still another species which has passed as *C. Hepburnii* but which is probably not even very closely related to it. This is the following species.

Carex elynaeformis sp. nov.

Dense caespitosa, rhizomate brevi ascendente; culmi erecti, tenues strictique, 15–20 cm. alti, obscure triangulares, valde canaliculati, glabri, folia aequantes aut parum superantes, pallide virides; vaginae annorum praecedentium diu persistentes filamentosiusculae, haud nitidae; folia numerosissima, setiformia, angustissima, stricta, canaliculata perconvoluta quapropter facie teretia, marginibus scaberrimis; spica solitaria, ebracteata, 1–1.3 cm. longa, androgyna interdum tota mascula, parte mascula valde conspicua linearisque, quam spica fere dimidio minor; utriculi 5 vel 6 adpressi-ascendentes; squamae orbiculares, obscure brunneae, margine pallido membranaceo, utriculi longitudine aequantes; utriculus plano-convexus vel compresse trigonus, 4–4.6 mm. longus, 1.3–1.5 mm. latus, stramineus apice obscurus, oblanceolatus, inferne in stipitem crassam desinens in rostrum brevem membranaceum contractam, marginibus superne scabris; nux facie lanceolata, valde trigona, circa 3 mm. longa; stigmatibus 3 (2).

Great Bear Lake: North shore of Smith Arm, Olmsted Bay, about 66° 32′ N., 122° 30′ W., sandy cutbanks, July 16–21, 1928, *5057* (type). A good match for the above is a plant in the National Herbarium of Canada, represented by three sheets: Colorado: Lake Creek, 12,000 ft., July 30, 1919, *I. W. Clokey 3403;* Mt. Elbert, 12,000 ft., July 20, 1919, *I. W. Clokey 3402;* Colorado Flora No. 4022, dry hills, Fall River Pass, Aug. 11, 1921, *I. W. Clokey et al. 3485,* (all distributed as *C. Hepburnii*).

Carex elynaeformis, by its prominent staminate part of the spike, approaches *C. filifolia* Nutt., but the scales are not papery white. From *C. nardina* and its var. *Hepburnii* it is abundantly distinct by its pale, conspicuously trigonous lanceolate achenes. In all *C. nardina* and its varieties the achenes are lenticular and of a very characteristic bluish gray colour. *Carex elynaeformis* appears to be another of the group of bicentric plants known only from high peaks of Colorado and from the northern Mackenzie District.

Carex chordorrhiza Ehrh.

Mackenzie River Delta: Richards Isl., *2182;* Kittigazuit, *2436;* Arctic Coast: Atkinson Pt., *2576;* Liverpool Bay, *2849;* Eskimo Lake Basin: 2nd lake, *2972;* Setidgi Lake, *3102;* Great Bear Lake: North shore, *5029;* Smith Arm, *5073;* McTavish Arm, *5260;* Keewatin Distr.: Lake on Tha-anne R., 60° 58′ N., 97° W., *5559;* west coast of Hudson Bay, 62° 5′ N., *5629;* Chesterfield, *6143;* Kazan R., Yathkyed Lake, *5761.*

Not uncommon from the Mackenzie Delta east to Hudson Bay, and north to a short distance beyond the tree limit. Not previously recorded from the Mackenzie District.

Carex diandra Schrank.

Great Bear Lake: McTavish Arm, *3702.*

Not previously known in the district from north of Great Slave Lake.

Carex disperma Dewey.

Mackenzie River Delta: Aklavik, *7303;* Great Bear Lake: McTavish Arm, *5339.*

New to the flora of the Northwest Territories.

Carex tenuiflora Wahlenb.

Mackenzie River Delta: Aklavik, *7304;* Eskimo Lake Basin: Setidgi Lake, *3132;* Great Bear Lake: McTavish Arm, *3619, 5262, 5343.*

Not previously known in the district from north of Great Slave Lake.

Carex norvegica Willd.

Eskimo Lake Basin: East of Mackenzie Delta, *2964.*

New to the flora of the Mackenzie District.

Carex neurochlaena Holm, in Am. Jour. Sci. **166**: 453. 1903, **167**: 301, 303. *f. 1, 2.* 1904.

Mackenzie River Delta: Kittigazuit Isl., margin of summer-dry creek, *2331;* Arctic Coast: 6 mi. east of Kittigazuit, rare in wet tundra, *2439;* Atkinson Pt., in dry *Carex*-bog some distance from coast, *2564;* Eskimo Lake Basin: North shore of 2nd lake, common in *Sphagnum*-bog, *2970;* Liverpool Bay, in a *Carex*-bog, *2851;* Great Bear Lake: North shore, *5031;* Cape McDonnel, *5115.* Somewhat rare or occasional, in dry tundra from the Mackenzie Delta east to Anderson River, south to Great Bear Lake.

Mackenzie (N. Am. Flora **18**: 90. 1931) has reduced *C. neurochlaena* to synonymy under *C. marina* Dewey (*C. glareosa* var. *amphigena* Fern.). With the abundant material now available this seems entirely unjustified. *Carex glareosa* as well as var. *amphigena* are true sea-shore plants, while *C. neurochlaena* is an inland plant. In the former two the culm is weak and generally decumbent, while in *C. neurochlaena* it is slightly curved, firm, and erect. Also in the latter the beak is slightly, but very characteristically, bent. *Carex neurochlaena* was previously known only from the type locality: Above Rink Rapids, Yukon R., *J. Macoun 53879* (Can). The type is annotated by Mackenzie: *"C. heleonastes."*

Carex bonanzensis Britt.

This rare *Carex,* previously known from a few collections near the type locality (Bonanza Cr., Dawson, Yukon) and from E. Siberia, was found growing abundantly in wet places in a meadow in the Mackenzie River Delta, East Branch, 68° 40′ N., Aug. 6, 1933, *6879.* New to the flora of the Northwest Territories.

Carex leptalea Wahlenb.

Great Bear Lake: McTavish Arm, east shore, *3762;* southeast shore, *3618.*

Carex obtusata Liljebl.

Arctic Coast of Yukon Territory: *7124;* Richardson Mts.: West of Mackenzie Delta, *6641;* Mackenzie River Delta: East Branch, *6890, 7015;* Richards Isl., *2060;* Kittigazuit Isl., *2330;* 6 miles east of Kittigazuit, *2450, 2451;* Arctic Coast: Tuktuayaktoq, *7408;* Liverpool Bay, *2848;* Eskimo Lake Basin: Kugaruk, *3078;* Great Bear Lake: North shore, *4926, 4927;* Dease Arm, *4830.*

Common or occasional in sandy places east to Great Bear Lake. New to the flora of the Northwest Territories.

Carex deflexa Hornem.

Great Bear Lake: Dease River Valley, *4870;* McTavish Arm, southeast shore, *3644;* Keewatin Distr.: Tha-anne R., 60° 58′ N., 97° W., *5560.*

New to the flora of the Northwest Territories.

Carex concinna R. Br.

Mackenzie River Delta: East Branch, *6963;* Campbell Lake, *1891;* Richards Isl., *2058;* Eskimo Lake Basin: Setidgi L., *3137;* Great Bear Lake: Ft. Franklin, *3197, 3210;* Dease Arm, *4755.*

Carex rupestris All.

Mackenzie River Delta: Campbell Lake, *1892;* Richards Isl., *2178;* Arctic Coast: Atkinson Pt., *2582;* Cape Dalhousie, *2714;* Great Bear Lake: Cape McDonnel, *5117.*

An eastern type, rare or occasional in the Mackenzie District, and probably reaching its western limit near the Mackenzie River.

Carex glacialis Mackenzie.

Mackenzie River Delta: East Branch, *7016;* Campbell Lake, *1890;* Great Bear Lake: Dease Bay, *4732, 4793;* McTavish Bay, southeast shore, *3645;* Great Bear River, Mt. Charles, *3290;* Keewatin Distr.: Kazan R., Yathkyed L., *5766;* Tha-anne R., *5564.*

Rare or occasional in sandy and gravelly places.

Carex eburnea Boott.

Mackenzie River Delta: Campbell Lake, *1894;* Great Bear Lake: Great Bear River, Mt. Charles, *3289.*

Previously known in the Mackenzie District only from the type locality, Ft. Norman.

Carex rufina Drejer.

Typical specimens of this rare species, previously known only from Greenland and northern Norway, were collected in Keewatin District: Near the edge of a summer-dry pond on Tha-anne R., 60° 58′ N., 97° W., July 12–13, 1930, *5566.*

Mackenzie (N. Am. Flora **18**: 232. 1935) gives the distribution of *C. rufina* as: "High northern sections of Greenland, etc." This is erroneous, because *C. rufina* is not an arctic species. On the west coast of Greenland it reaches 69° 15′ N., but in most years at its northern limit it is unable to mature fruits. *Carex rufina,* although it forms pure stands, is a most inconspicuous species, easily overlooked because normally the flowering culms are completely concealed among the leaves.

Carex bicolor All.

Arctic Coast: 6 miles east of Kittigazuit, *2446, 2447;* Cape Dalhousie, *2716;* Great Bear Lake: Dease Arm, north shore, *4889;* Haldane R., *4918, 4919;* Smith Arm, north shore, *5058;* Keewatin Distr.: Lake on Tha-anne R., *5557;* Mistake Bay, *5628.*

Not previously recorded from the Mackenzie District.

Carex Garberi Fern.

Mackenzie River Delta: South end of Richards Isl., *7062;* north end, *2183;* Great Bear Lake: Great Bear River, *3264;* Dease Arm, *4792;* McTavish Arm, *3675, 5288, 5325.*

Not previously recorded from north of Great Slave Lake.

Carex livida Willd. var. **Grayana** (Dewey) Fern.

Eskimo Lake Basin: 2nd lake, 69° N., 132° 30′ W., *2965.*

Our specimens grew in a large stand in a wet meadow, and on Aug. 18, 1927, had mature fruit. New to the flora of the Northwest Territories and not before recorded from the Mackenzie basin.

Carex Williamsii Britt.

Mackenzie River Delta: North end of Richards Isl., *2173;* Arctic Coast: 6 miles east of Kittigazuit, *2448;* Liverpool Bay, *2845;* Eskimo Lake Basin: 2nd lake, *2968;* Keewatin Distr.: Kazan R., Yathkyed Lake, *5759.*

New to the flora of the Mackenzie basin.

Carex Oederi Retz. var. **pumila** (Cosson & Germ.) Fern.

Great Bear Lake: South shore, Leith Pt., *3530, 3558;* Cape McDonnel, *5126.*

Not previously recorded in the Mackenzie country from north of Great Slave Lake.

Carex petricosa Dewey.

Richardson Mts.: Eastern slope, west of Mackenzie Delta, alpine tundra, 2000–3000 ft., in beginning anthesis, *6647, 6648;* Arctic Coast: Liverpool Bay, 70° N., 129° W., dry edge

of a small tundra pond, fruiting specimens, Aug. 15, 16, 1927, *2840;* Great Bear Lake: North shore of Dease Arm, 67° 02′ N., 119° 50′ W., flowering specimens, June 23–27, 1928, *4676, 4887.*

This very striking species has been collected but a few times, all in the general vicinity of the type locality in the Canadian Rockies: Banff, July 14, 1900, *N. B. Sanson 25498* (Can); Mt. Rendle, 6000′, Aug. 7, 1902, *N. B. Sanson* (G); Banff, Aug. 4, 1891, *J. Macoun 7425* (Can). Our specimens are a close match for these. In some of the spikelets of our no. *2840,* a few perigynia have two instead of three stigmas.

Carex atrofusca Schk.

Common in not too dry tundra from mountains west of Mackenzie Delta to Hudson Bay, south to Great Bear Lake, where it is alpine or restricted to "barrens" and absent in wooded parts. As the writer has pointed out (in Rhodora **41**: 204. 1939), it is strange that this species, common throughout the "barren grounds," was not collected by Richardson, and that it has not previously been collected in the Mackenzie District.

Carex atrofusca Schk. var. **decolorata** var. nov.

A specie differt squamis anguste lanceolatis, cinnamomeis, nervo medio obscuro, utriculisque cinnamomeis basi nigro-purpurascentibus, 3.5–4 mm. longis; nuce 1.4 mm. longa.

Great Bear Lake: Cape McDonnel, low tundra, Aug. *2,* 1928, *5120* (type).

Carex rariflora (Wahlenb.) Sm. var. **androgyna** var. nov.

A specie differt spiculis terminalibus androgynis stigmatibus *2* nec 3.

Arctic Coast: Atkinson Pt., 70° N., 131° *20′* W., Aug. 1–3, 1927, *2579* (type).

Carex limosa L.

Eskimo Lake Basin: Setidgi Lake, *3135;* Great Bear Lake: McTavish Arm, north shore, *5220;* southeast shore, *3601.*

In the Mackenzie District not recorded from north of Great Slave Lake.

Carex paupercula Michx.

Great Bear Lake: McTavish Arm, north shore, *5221;* east shore, *3723.*

Not previously recorded in the Mackenzie District from north of Great Slave Lake. Mackenzie (N. Am. Flora **18**: 351. 1935) points out that *C. paupercula* Michx. is not to be confused with the South American *C. magellanica* Lam., which has "the terminal spike normally gynaecandrous." In our no. *5221* fully half of the terminal spikes are gynaecandrous.

Carex media R. Br. in Richardson in Franklin's Journ. App. 750. 1823.

Carex Vahlii Schk. var. *inferalpina* sensu Fernald in Rhodora **35**: 220–223, 398. 1935, non Wahlenb.

Carex angarae Steud. See Rhodora **41**: 203–205. 1939.

Common in the Mackenzie District, in the wooded parts, north to the Mackenzie Delta (Eskimo Lake Basin, Setidgi Lake, *3138*) and Great Bear Lake.

Carex norvegica Retz. Fl. Scand. Prodr. ed. 1. 179. 1779, non Willd.

Carex Vahlii Schk.

Keewatin Distr.: West coast of Hudson Bay west to Kazan R., Yathkyed Lake, *5757, 6142.*

An eastern type not known west of the last-mentioned station.

Carex holostoma Drejer.

Mackenzie River Delta: Richards Isl., *2181, 7064;* Arctic Coast: 6 miles east of Kittigazuit, *2442;* Cape Dalhousie, *2723;* Liverpool Bay, *2846;* Great Bear Lake: McTavish

Arm, east shore, *3711, 3722;* north shore, *5259;* fjords on the east shore, *5342;* KEEWATIN DISTR.: Kazan R., Yathkyed Lake, *5762;* Baker Lake, *6080;* Lake on Tha-anne R., *5561;* Mistake Bay, *5630;* Chesterfield, *6144.*

Although Polunin (l. c., 129) records this species as "new to North America, outside Greenland," the writer and his brother thirteen years earlier, in 1927, collected it from numerous stations in the Mackenzie District. *Carex holostoma* is a truly arctic species widely distributed in arctic parts of North America, from the Mackenzie R. east to central parts of West Greenland, south to the edge of the forest. It is absent in East Greenland and Iceland but has an isolated occurrence in northernmost Scandinavia. The illustration in Mackenzie, l. c., *tab. 414,* 1940, is very poor; a much better one is in Ostenfeld, Fl. Arct. *fig. 32.* 1902.

Carex stylosa C. A. Mey.

GREAT BEAR LAKE: Cape McDonnel, *5105A.*

Not previously recorded from the Northwest Territories.

Carex podocarpa R. Br. See Rhodora **41:** 205–206. 1939.

RICHARDSON MTS.: *6645, 6646, 6763, 6764, 6766, 6767;* ARCTIC COAST: West of Mackenzie Delta, *6903, 7090.*

Common in mountains west of the Mackenzie Delta, north to the arctic coast, on snow-flushes and in herb mats.

Carex nesophila Holm.

RICHARDSON MTS.: Eastern slope, west of Mackenzie Delta, 4000′ elev., *6644.*

New to the flora of the Northwest Territories.

Carex atrosquama Mackenzie.

GREAT BEAR LAKE: Smith Arm, north shore, *4991;* Keith Arm, Deerpass Bay, *3457;* Etacho Pt., alpine meadows, *3476.*

Rare or occasional in meadows in the Paleozoic country about the west end of the lake. New to the flora of the Northwest Territories.

Carex albo-nigra Mackenzie.

MACKENZIE RIVER DELTA: East Branch, 68° 55′ N., *7017;* ARCTIC COAST: East of Mackenzie Delta, *2583A;* GREAT BEAR LAKE: Cape McDonnel, *5104;* McTavish Arm, north shore, *5289.*

In rather wet tundra. New to the flora of the Northwest Territories.

Carex Buxbaumii Wahlenb.

GREAT BEAR LAKE: South shore, Leith Pt., *3532, 3566.*

Typical specimens were found on wet shores of a limestone island. New to the flora of the Northwest Territories.

Carex Morrisseyi sp. nov.

Rhizomata longa tenuia non-stolonifera; culmi solitarii aphyllopodici tenues erecti, 20–35 cm. alti, acutanguli superne scabri; folia plana, circa 3 mm. lata, marginibus scabris, revolutis, aeque ac culmi cinereo-viridia, culmo dimidio breviora; spiculae 3 vel 4 valde approximatae, sessiles vel inferior breviter pedunculata, mascula (vel rarissime androgyna) terminalis linearis vel lineari-clavata, 10 mm. longa, laterales 2 vel 3 foemineae, ellipsoideo-obtusae, 10–12 mm. longae, densiflorae; bractea inferior setacea quam spicula multo brevior, evaginata; squamae foemineae ovatae vel ovato-cuspidatae (nunquam aristatae) nigrae, nervo medio pallido prominente (squamae masculae longiores angustioresque, obscure castaneae); utriculi squamas superantes, ovato-ellipsoidei subcompressi cinereo-virides superne distincte papillosi, 3 mm. longi, brevissime stipitati, in rostrum brevissimum fauce integro abrupte contracti; stigmata brevia 3 (aliquando 2); nux obovata sessilis, trigona, 2 mm. longa, in stylum brevem contracta.

Wet, marshy places on pre-Cambrian rock from Labrador coast to Great Bear Lake.

LABRADOR: Cutthroat Harbor, south of Cape Mugford, 57° 30′ N., 62° W., low granite island, Aug. 26, 1937, Bartlett Greenland Expedition, 1937, *A. E. Porsild 173* (TYPE); Okkak, near Cutthroat Tickle, 57° 40′ N., 62° W., Aug. 12–14, 1937, *V. C. Wynne-Edwards 7523;* KEEWATIN DISTR.: Yathkyed Lake on the Kazan R., 62° 30′ N., 97°–98° 30′ W., Aug. 1–15, 1930, *5775;* MACKENZIE DISTR.: GREAT BEAR LAKE: McTavish Arm, Conjuror Bay, 65° 50′ N., 117° 15′ W., Aug. 15, 1928, *3674;* Cape McDonnel, low tundra and lake shore, Aug. 2, 1928, *5105;* north shore, *4991A.*

Carex Morrisseyi commemorates Captain Robert A. Bartlett's schooner Effie M. Morrissey, veteran of numerous arctic voyages. It belongs in the section *Atratae* Kunth and admittedly is closely related to *C. Buxbaumii* Wahlenb. (*C. polygama* auctt., non Gmel., fide Mackenzie), of which polymorphous species var. *heterostachya* Anders. also has the terminal spikelet staminate ("spicula terminalis mere ♂") ; but it is certainly abundantly distinct from all American forms of that species.

Carex Buxbaumii of Europe has recently been revised by Cajander (Ann. Bot. Soc. Zool.-Bot. Fenn. **5**: 5. 1935), who divides the species into several subspecies and varieties and who reports that plants with staminate terminal spikelets are not rare in Fennoscandia. He assumes (under *C. polygama* ssp. *alpina* (Hartm.) Cajander) that Hartman "with his γ *heterostachya* by and large had in mind specimens belonging just with this subspecies" (translated from Cajander's German text, l. c. 22).

Carex polygama ssp. *alpina,* however, is described and illustrated with a gynaecandrous terminal spikelet, and, while in Scandinavia staminate terminal spikelets may occur in all "forms" of the collective species, in our plant this is the rule. Thus, at the type locality, in a large colony, but three specimens could be found in which the terminal spikelet was androgynous and none that were gynaecandrous. Also in our plant the spikelets are more densely aggregate and but rarely with the lowermost spikelet somewhat remote; moreover it appears to have a distinct sub-arctic geographical range of its own. Intermediate forms between it and *C. Buxbaumii* have never been observed, nor have variations in *C. Buxbaumii* ever been recorded from North America having other than "oblong-ovoid gynaecandrous" terminal spikelets.

Carex anguillata Drejer in Revis. Crit. Car. 454. 1841; Steudel in Syn. Pl. Cyp. 214. 1855; Fl. Dan. **16**: *tab. 2846.* 1871.

GREAT BEAR LAKE: Smith Arm, north shore, *4988;* Cape McDonnel, *5114, 5109;* McTavish Bay, north shore, *5172;* KEEWATIN DISTR.: Kazan R., Yathkyed L., *5767, 5774;* Tha-anne R., *5565;* Chesterfield, *6146.*

Carex anguillata has been referred by Boott to *C. aquatilis* var. *minor,* whereas by most other writers it is placed with *C. rigida* Good. Both interpretations seem unsatisfactory in view of the long-peduncled, long- and lax-flowered pistillate spikelets, although there can be little doubt that the affinity is with the latter.

Fernald, in Rhodora **36**: 91. 1934, drew attention to Drejer's *C. anguillata,* almost forgotten since Kükenthal (l. c., 302) reduced it to an unimportant form of *C. concolor* R. Br., citing specimens from Iceland and from Labrador (*A. P. Low 13459,* Can). Fernald suggested its presence in Greenland and Maine, while Mackenzie, l. c., cited material also from Hudson Bay and Keewatin.

Carex anguillata seems amply distinct from *C. concolor* and is not rare in S. Greenland, Labrador, and Keewatin, west to Great Bear Lake. It grows in sandy well-drained soil, where it forms a loose turf. The specimens cited above from the writer's collection are fairly typical.

Carex concolor R. Br. seems to be absent in continental parts of N. America west of Hudson Bay.

Carex lugens Holm. See Mackenzie in N. Am. Flora **18:** 401. 1935, excl. *C. consimilis* Holm; also, Porsild in Rhodora **41:** 208. 1939.

Arctic Coast of Yukon Territory: *7088, 7126;* Richardson Mts.: *6642A, 6643, 6765;* Mackenzie River Delta: East Branch, *6537, 6957, 6990, 6991, 7017A;* Campbell Lake, *1893;* south end of Richards Isl., *2059, 2064, 2065, 7063;* north end of Richards Isl., *2164, 2175–2177;* Kittigazuit, *2325;* Arctic Coast: East of Delta, *2444;* Eskimo Lake Basin: 2nd lake, *2963.*

The above series is rather uniform; most numbers have a few staminate flowers at the apex of the lateral spikelets. *Carex lugens* is a common species in Alaska, Yukon, and Northwest Mackenzie District east to Keewatin. It grows in old, well-established tundra where it forms large, compact tussocks.

Carex consimilis Holm in Am. Jour. Sci. **166:** 457. 1903, **167:** 310. 1904.

Besides the type the following specimens, all in the National Herbarium of Canada, are typical: Yukon Territory: Lake Kluane to Don Jek R., *A. Müller,* Aug. 11–27, 1920; Mackenzie Delta: Kittigazuit, *2323;* Arctic Coast: East of Mackenzie Delta, *2443;* Atkinson Pt., *2583;* Cape Dalhousie, *2730;* Liverpool Bay, *2853;* Great Bear Lake: North shore, *4922;* Cape McDonnel, *5103, 5128A;* Keewatin Distr.: Kazan R., Yathkyed Lake, *5772.*

This species has been placed by Mackenzie, l. c., under *C. lugens* Holm, but the type (*John Macoun 53878,* Can) differs so much from *C. lugens* in its strong, horizontal rhizomes, the short and broad leaves and stout culms, etc., that this interpretation is most unsatisfactory. Moreover, there is in the writer's collection a series of plants that completely match the type as well as the description. Lacking the dense, caespitose habit of *C. lugens,* these plants, in the field, had been tentatively labelled *C. concolor* for lack of a more satisfactory name, although it was even then realized that true *C. concolor* is absent in continental parts of North America west of Hudson Bay and that our plant, moreover, differs consistently from it by its short, oval-oblong, almost black, contiguous spikelets. *Carex consimilis* grows in dry peaty places in lowland tundra.

Carex aquatilis Wahlenb.

Common in the Mackenzie valley north to the Arctic Ocean and east to Great Bear Lake, chiefly in alluvial soils along the north-flowing rivers. It is a truly boreal, though not at all an arctic species, which in the delta of the Mackenzie reaches slightly beyond the limit of trees. Along the Mackenzie it forms extensive meadows and in the delta it is one of the principal sources of native hay.

Carex stans Drejer, Revis. Crit. Car. 458. 1841; Fl. Dan. **14:** *tab. 2477* (poor). 1849; Steudel, Syn. Pl. Cyp. 210. 1855; Lange, Consp. Fl. Groenl. 147. 1880.

Carex aquatilis var. *stans* (Drejer) Ostenf. Fl. Arct. 70, *fig. 43.* 1902.

Carex aquatilis var. *minor* Boott, Carex **4:** 163, *tab. 545* (good). 1867.

Carex stans differs from *C. aquatilis* in its shorter and stouter culms, which are nearly always longer than the leaves; the latter are flat, or the margins may be slightly involute, generally broader, never conduplicate or glaucous as in *C. aquatilis.* The sheath of the lower bract is more loosely clasping and generally black-auricled. The staminate spikelet is solitary (rarely 2); the pistillate ones are shorter and thicker than in *C. aquatilis.* Perigynia tend to be slightly longer, stramineous rather than green, and often dark-tipped, smooth, under a lens not conspicuously punctate; scales somewhat longer, often equaling the perigynia, dark brown or even black with a pale mid-vein (much darker than in *C. aquatilis*).

Carex stans in its distribution is truly arctic. That it is not merely an arctic form or race seems amply proved by the fact that in W. Greenland it reaches south only to lat. 68° and is absent on the east coast south of 76°. South of these latitudes it is not replaced by *C. aquatilis,* which appears to be wanting in Greenland.

Polunin, l. c., 132, records *C. aquatilis* from the eastern Canadian Arctic, but mentions "intermediate" forms between that species and "var. *stans.*" Polunin probably did not understand *C. aquatilis,* and all records of that species from the eastern Arctic should be changed to *C. stans.*

Distribution: Arctic-circumpolar (except Iceland); across N. America, and southward almost to the limit of trees.

Carex salina Wahlenb.

Mackenzie River Delta: North end of Richards Isl., *2166, 7448;* Eskimo Lake Basin: Kugaruk, *3080.*

Our plant is intermediate between typical *C. salina* Wahlenb. and *C. subspathacea* Wormskj., but it is a much coarser plant than the latter. It is *C. salina* α *stricta* Drejer (in Revis. Crit. Car. Bor. 452. 1841), which Kükenthal reports from the Bering Sea (*Macoun 16619*), and probably also *C. Hopnerii* Boott (in Hook. Fl. Bor.-Am. **2**: 219. *tab. 220.* 1839). Also it is a near match for specimens from the Bering Sea referred by Hultén to *C. Ramenskii* Kom. (Rep. Sp. Nov. **13**: 164. 1914). Typical *C. subspathacea* Wormskj., in America, seems to be an eastern arctic species, on the arctic coast reaching west to Dolphin and Union Strait (*Can. Arct. Exp. 341, 378,* Can).

Carex microglochin Wahlenb.

Great Bear Lake: North shore, Haldane R., *5032;* Cape McDonnel, *5127;* McTavish Arm, north shore, *5171.*

Not previously recorded from the Mackenzie District.

Carex physocarpa Presl.

Mackenzie River Delta: East Branch, *6989;* Aklavik, *3183;* Kittigazuit Isl., *2322;* Arctic Coast: 6 miles east of Kittigazuit, *2441;* Atkinson Pt., *2570, 2571;* Cape Dalhousie, *2724;* Eskimo Lake Basin: 2nd lake, *2967.*

A western arctic species common in Alaska and Yukon, eastward to the Mackenzie Delta, and in the alpine Rocky Mountains to the south. All records from east of the Mackenzie River and east of the Rocky Mountains no doubt should be referred to *C. saxatilis* L. Compare also Polunin, l. c., 136.

Carex saxatilis L.

An eastern arctic species, the N. American distribution of which includes E. & W. Greenland, N. Labrador, Baffin Isl., and the country from Hudson Bay west to Lake Athabaska and Great Bear Lake.

Carex membranacea Hook.

One of the most common and most truly arctic sedges, abundant from Alaska to northern Labrador and south to the limit of trees. It is strange that it has not reached Greenland.

Carex rotundata Wahlenb.; Hook. Fl. Bor.-Am. **2**: 220. 1839, Bear Lake record only; Mackenzie, N. Am. Flora *tab. 518.* 1940, not as to text and distribution (**18**: 454. 1935); Gray's Man. ed. 7. 255, *fig. 552,* excl. distr.

Mackenzie River Delta: North end of Richards Isl., *2163;* Eskimo Lake Basin: North shore, 2nd lake, *2971;* Great Bear Lake: ? Fort Enterprise, *Richardson.*

Mackenzie, l. c., appears to have been misled by writers on the flora of Greenland, including Ostenfeld in Fl. Arctica, who have confused *C. rotundata* with *C. saxatilis*. Why this should be is not easy to understand, because *C. rotundata* is a clear-cut and well-marked species. It is well-described and illustrated in Gray's Man., l. c., from a typical specimen in the Gray Herbarium labelled: "*C. rotundata* Wahl. dedit Wahl. from I. Br. herb." Mackenzie's plate also is very good.

Carex rotundata Wahlenb. is an arctic Eurasian species which enters N. America in Alaska and northwest Mackenzie. It is a very rare plant in American herbaria, where most plants so-named should be referred to *C. saxatilis* or to *C. membranacea*. Although for a hundred years it has been recorded from Greenland by most authors on that flora, the present writer has never, in many years of collecting in that country, been able to satisfy himself as to the authenticity of Greenland material thus named. Recently Sørensen (Medd. om Grønl. **101**[3]: 122. 1933, **101**[4]: 83. 1934) has voiced such doubt, stating simply that, by comparison with authentic Scandinavian material, all Greenland specimens previously called *C. rotundata* are referable to *C. saxatilis*. With this view the writer is in complete accord.

Carex oligosperma Michx.

Although Richardson collected this species on Great Bear Lake, the writer did not see it there. It was collected recently on the Yellowknife R., 63° 30′ N., 111° W., by J. Carroll (*8*, Can).

LEMNACEAE

Lemna trisulca L.

Mackenzie River Delta: East Branch, 68° 40′ N., *7375;* Aklavik, 68° 12′ N., 135° W., flowering sparingly in a shallow lake, Sept. 1, 1934, *7305;* lake between delta and Eskimo Lakes, 68° N. (fragments in muskrat "push-up" on the ice), Nov. 2, 1933, *6932*.

Lemna trisulca in the Mackenzie basin was previously known north to Lake Athabaska and the Wood Buffalo Park, 60° N. (*Raup*), and the above numbers, therefore, represent a considerable extension of the known range.

ARACEAE

Calla palustris L.

Mackenzie River Delta: Lake on the portage trail between Campbell and Setidgi Lakes, about 68° N., 133° W., rhizomes with young leaves, June 16, 17, 1927, *2023;* Eskimo Lake Basin: Creek above Setidgi L., plants with mature fruit, Aug. 24, 1927, *3175;* tundra lake between delta and Eskimo Lakes, fragments from muskrat "push-up," Nov. 2, 1933, *6933;* Mackenzie River: Lake near Sans Sault Rapids, 65° 40′ N., Sept. 20, 1928, *3400*.

Calla palustris was previously known north to Great Slave Lake (*Raup*). The above numbers represent a considerable extension of the known range.

LILIACEAE

Tofieldia nutans Willd. See Porsild in Rhodora **41**: 213. 1939.

Mackenzie River Delta: Husky R., in a muskeg, *6779*.

New to the flora of Canada.

Lloydia serotina (L.) Reichb.

Richardson Mts.: West of Mackenzie Delta, rare in alpine tundra, *6653;* Arctic Coast of Yukon Territory: King Pt., *7130*.

Alaska-Yukon east to Mackenzie R. New to the flora of the Northwest Territories.

Smilacina stellata (L.) Desf.

GREAT BEAR LAKE: Great Bear R., Foot of Mt. Charles, *3310.*

New to the flora of the Northwest Territories.

ORCHIDACEAE

Cypripedium parviflorum Salisb.

MACKENZIE RIVER: Bear Rock at Ft. Norman, *3381;* GREAT BEAR LAKE: Great Bear River, Foot of Mt. Charles, *3291, 3326;* west shore, 65° 30′ N., *J. M. Bell 22974* (Can).

New to the flora of the Northwest Territories.

Cypripedium guttatum Sw.

MACKENZIE RIVER: Ft. Norman, *G. Hume 103449* (Can).

Not previously recorded in our region from north of Great Slave Lake (*Raup*).

Orchis rotundifolia Pursh.

MACKENZIE RIVER DELTA: Campbell Lake, *1983;* GREAT BEAR LAKE: McTavish Arm, east shore, *3622, 3763;* southeast shore, *5296;* Leith Pt., south shore, *3576.*

Not previously recorded from north of Great Slave Lake.

Habenaria obtusata (Pursh) Richards.

Common in the Mackenzie region north to the limit of trees, occasional or rare for a short distance beyond. The known north limit is on the Arctic Coast: 6 miles east of Kittigazuit, *2461.*

Goodyera repens (L.) R. Br.

MACKENZIE RIVER: Sans Sault Rapid, *6561.*

Previously recorded from Great Bear Lake by Richardson.

Listera borealis Morong.

MACKENZIE RIVER DELTA: East Branch, *6576, 7280;* GREAT BEAR LAKE: Keith Arm, Ft. Franklin; south shore, Leith Pt., *3539;* Bear R., *3361.*

Previously known on the Mackenzie northward only to Ft. Simpson.

Corallorrhiza trifida Chat.

MACKENZIE RIVER DELTA: Husky R., *6654;* Aklavik, *6575;* East Branch, *6540;* Campbell Lake, *1984, 1985;* Richards Isl., *2190;* ARCTIC COAST: 6 miles east of Kittigazuit, *2460;* GREAT BEAR LAKE: Bear R., *3275;* McTavish Arm, *5227, 5294, 5294A, 5327;* Dease Arm, *4681, 4733, 4892;* Keith Arm, Russel Bay, *3409;* Etacho Pt., *3486;* south shore, Leith Pt., *3537, 3575;* MACKENZIE RIVER: Root R., 62° 30′ N., *6273;* KEEWATIN DISTR.: Mistake Bay, 62° 05′ N., *5648.*

Fairly common in the Mackenzie District, north to the limit of trees or a short distance beyond. Not previously recorded from north of Great Slave Lake or from Keewatin District.

SALICACEAE

When pushing his way for endless, weary miles through unmapped, pathless "bushland" of the Northwest Territories, in winter by dog team or on snowshoes, in summer on foot or by canoe, the writer was always reminded of the dictum of that great student of North American willows, who said: "We know, however, almost nothing of the *Salix* flora of the woodland region of the Northwest Territories, which must be an Eldorado for willows" (C. Schneider in Bot. Gaz. **66**: 340. 1918).

The writer now regrets that before going into the North he was unable to prepare himself adequately for the study of the willows in the field. Although in the Northwest Territories he collected a total of 35 species, represented by

235 collections aggregating about 1000 sheets, he realizes that too often the collecting of critical species was done in a haphazard way and without sufficient notes. The willow collection has been named and studied by the Swedish salicologist, Dr. B. Floderus. Pending the publication of Dr. Floderus' notes the following distributional data on the more interesting species are given.

Salix arbusculoides Anders.

One of the most common willows of the lower Mackenzie valley, represented by several series of collections. In the Mackenzie Delta, north of the continuous spruce forest, it forms dense thickets and "willow islands" 10–15 feet high, and in the forest it often forms the principal "underbrush" with tree-like bushes 15–20 ft. high. North of Great Bear Lake and in the Keewatin District it reaches a short distance beyond the tree limit, where it was collected along Kazan R. at Yathkyed L., *5789*.

Salix arbutifolia Pall.

Salix fuscescens Anders.

Arctic Coast of Yukon Territory: Shingle Pt., *7093;* Mackenzie River Delta: East Branch, *6955;* Arctic Coast: East of Mackenzie, *2467, 2589, 2590, 2866, 2976;* Keewatin Distr.: Kazan R., *6025*.

New to the flora of Canada.

Salix arctophila Cockerell.

A common species in wet tundra north of the forest. Although apparently an eastern species, it extends across the continental Northwest Territories from Hudson Bay to the Arctic Coast west of the Mackenzie Delta (*7091, 7172*).

Salix candida Flügge.

Great Bear Lake: Bear R., *3251*.

Although it was recorded by Richardson as occurring "throughout the wooded country," the writer saw this species but once.

Salix Chamissonis Anders.

Richardson Mts.: Grassy slopes in the foothills, 1500′, *6781, 7329*.

This rare willow, previously known only from the Bering Sea region, is new to the flora of Canada.

Salix glauca L. var. **acutifolia** (Hook.) Schneid. in Bot. Gaz. **66**: 327. 1918.

Salix Seemannii Rydb.

Mackenzie River Delta: Limestone scree, Richardson Mts., *6783;* East Branch, *7250, 7253;* Campbell Lake, *1904;* Arctic Coast of Yukon Territory: King Pt., *7131;* Great Bear Lake: Keith Arm, *3410, 3411;* McTavish Arm, north shore, *5263*.

This is a common and most variable shrub, in our region chiefly on Paleozoic formations or at least with a preference for calcareous soil.

Salix fullertonensis Schneid.

This eastern species, previously recorded westward only as far as Coronation Gulf, proved very common on "barrens" along the shores of Great Bear Lake, *4685, 4686, 4687, 5135, 5136, 5138A, 5653*.

Salix glacialis Anders. See Schneider in Bot. Gaz. **67**: 63–64. 1919.

This rare willow, known only from a few places in Alaska, was collected on a sandy beach near Shingle Pt., Y. T., *7094*. New to the flora of Canada.

Salix herbacea L.

Great Bear Lake: Dease Valley, *4874;* Keewatin Distr.: Kazan R., Yathkyed L., *5787;* Lake on Tha-anne R., *5560A;* west coast of Hudson Bay, Mistake Bay, *5650*.

This eastern species, which has not previously been collected west of Hudson Bay, is within its range ubiquitous in herb-mats and on snow-flushes. Its scarcity in the interior may be due in part to the aridity of the climate and consequent lack of suitable stations.

Salix hudsonensis Schneid.

An eastern species, with a distribution pattern somewhat similar to that of *S. fullertonensis,* collected by us on Great Bear Lake, *5138B*, and on the Arctic Coast west to the Mackenzie Delta (numerous collections). Previously recorded by Schneider westward to Coronation Gulf.

Salix lingulata Anders. See Schneider in Bot. Gaz. **66:** 353. 1918.

Arctic Coast of Yukon Territory: King Pt., *7173;* Mackenzie River Delta: East Branch, *7366;* Campbell Lake, *1986;* Kittigazuit, *2468* (× *niphoclada*); Great Bear Lake: North shore, *4688A and B, 4689.*

Salix niphoclada Rydb. See Schneider in Bot. Gaz. **66:** 339. 1918.

Arctic Coast: Liverpool Bay, *2861, 2862;* Great Bear Lake: Cape McDonnel, *5137;* Great Bear R., Mt. Charles, *3327.*

This little-known willow, the type of which came from the lower Mackenzie River, appears to be fairly common in the Paleozoic country of the northwestern Mackenzie District.

Salix nivalis Hook. var. **saximontana** Rydb.

Keewatin Distr.: Lake on Tha-anne R., *5574.*

According to Floderus (in litt.) this is represented in our collections by this single number.

Salix pedicellaris Pursh var. **hypoglauca** Fern.

Keewatin Distr.: Lake on Tha-anne R., in a *Carex* bog, *5573.*

Represented in the collection by this single number. New to the flora of Keewatin.

Salix phlebophylla Anders.

Vaccinium caespitosum sensu Holm & Macoun in Rept. Can. Arct. Exp. **5A:** 18. 1921, not Michx.

This tiny Alaskan willow is rare on dry tundra ridges in the Caribou Hills east of the Mackenzie Delta: East Branch, *7263;* Kittigazuit, *2469.* Also there is a single collection from Richardson Mts., west of Mackenzie Delta, *O. Bryant 6581.* The first and only previous collection from Canada was made at Herschel Island, Y. T., by the Canadian Arctic Expedition, but recorded by Macoun & Holm, l. c., as *Vaccinium caespitosum.*

Salix pulchra Cham.

One of the most common willows in the Mackenzie Delta, where it grows in alluvial soil, often with *S. arbusculoides.* It has tentatively been referred by Floderus (in litt.) to *S. pulchra* var. *yukonensis* Schneid. *Salix pulchra* is common in Alaska and in the Yukon and was recorded by Ostenfeld (in Gjöa Exp. 35) from the Arctic Coast west of the Mackenzie Delta. One collection from Richardson Mts., west of the Mackenzie Delta, *7328,* also seems to belong to the species.

MYRICACEAE

Myrica Gale L.

Very common and represented by numerous collections from Great Bear Lake, where it had been collected previously by Richardson. Apparently rare in the

Mackenzie River Delta (Campbell Lake, *1901*) and in Keewatin District (Lake on Tha-anne R., *5526*).

BETULACEAE

Betula microphylla Bunge.

MACKENZIE RIVER DELTA: West Branch, *O. Bryant 6584;* East Branch, *7465;* Setidgi Lake, *3143;* GREAT BEAR LAKE: McTavish Arm, *5229, 5230.*

Rare or occasional from the Mackenzie Delta east to Great Bear Lake. In the Mackenzie Delta, *B. microphylla* is a small tree rarely more than 12 feet high, quite unlike *B. papyrifera* in shape and foliage. The leaves turn fully two weeks earlier than those of the latter.

Betula papyrifera Marsh. var. **neoalaskana** (Sarg.) Raup.

According to Dr. Hugh M. Raup, who has kindly examined the birches in the writer's collection, this appears to be the common tree-like species of the Mackenzie Delta, the lower river, and Great Bear Lake. The paper birch is rare in the low parts of the Delta but on the higher east and west banks, and on Bear Lake, it reaches a height of about 30 feet, with trunks 8 inches in diameter. On the East Branch it does not extend quite as far north as the spruce (*Picea glauca*).

Betula papyrifera Marsh. var. **occidentalis** Sarg.

MACKENZIE RIVER: Bear Rock, near Fort Norman.

In the Mackenzie Basin outside the mountains not previously recorded from north of Lake Athabaska.

POLYGONACEAE

Koenigia islandica L.

KEEWATIN DISTR.: Lower Kazan R., 97° W., *6026* (new western limit).

While Polunin, l. c., states that this plant is circumpolar and Hultén (Fl. Kamtchatka 2: 42. 1928) gives its American distribution as "along the Arctic Coast to Baffin Land," the fact remains that it has never been collected between the Seward Peninsula in Alaska and the Keewatin District.

Rumex acetosa L.

RICHARDSON MTS.: West of Mackenzie Delta, *6656, 6786.*

New to the flora of the Northwest Territories.

Rumex pallidus Bigel.

MACKENZIE RIVER DELTA: Aklavik, occasional on sandy river banks, *7300;* East Branch, *7299, 7307;* Richards Isl., *2075;* Kittigazuit, *2472.*

Polygonum alpinum All. var. **lapathifolium** Cham. & Schlecht.

MACKENZIE RIVER DELTA: East Branch, *6502, 7295;* Peel River, *Miss E. Taylor 73* (Can).

Our plant is probably "*P. alpinum* γ foliis ovato-acuminatis glaberrimis. . . . Arctic Sea-coast, *Dr. Richardson,*" in Hooker, Fl. Bor.-Am. **2**: 131, although it actually does not reach north beyond the limit of trees in the Mackenzie Delta. It is taller and more robust than the plant of the Bering Sea region and perfectly glabrous. It is best developed in ravines on the East Branch, where, on the freshly exposed calcareous clay of recent landslides, it forms pure stands of an acre or more in extent. Here the plant may grow 5 or 6 feet high, with 50 or more stems from one root. The shoots are edible when young and are used locally as rhubarb.

CHENOPODIACEAE

Suaeda maritima (L.) Dumort.

Chenopodium maritimum L., Hook. Fl. Bor.-Am. **2**: 126. 1838.

Arctic Coast: Atkinson Pt., *2605;* Great Bear Lake: North shore of McTavish Arm, near mineral spring, *5193.*

PORTULACACEAE

Montia lamprosperma Cham.

Polunin, l. c., suggests that this is circumboreal, but actually, like *Koenigia islandica,* it appears to be absent between the western tip of Alaska and the west coast of Hudson Bay.

CARYOPHYLLACEAE

Arenaria arctica Stev.

Apparently common in mountains west of the Mackenzie Delta and along the arctic coast of the Yukon Territory. Richardson's "Shores of the Arctic Sea," in Hook. Fl. Bor.-Am. **1**: 100, no doubt, refers to the latter place. We never collected it east of the delta nor at Great Bear Lake, although it was collected once in the latter place by *J. M. Bell* in 1900 (*22887,* Can). A still more puzzling collection is that of *A. P. Low,* Northern Labrador (Ungava), Aug. 1897 (*18258,* Can).

Arenaria dawsonensis Britt.

Great Bear Lake: Dease Arm, *4805;* north shore, *5078;* McTavish Arm, *3779, 5269, 5298.*

Common on the pre-Cambrian east shore of the lake.

Arenaria humifusa Wahlenb.

Mackenzie River Delta: Campbell Lake, *1911;* Great Bear Lake: Smith Arm, *4997;* McTavish Arm, *3766;* south shore, Leith Pt., *3578;* Keewatin Distr.: Kazan R., *6027;* Yathkyed L., *5793.*

Arenaria laricifolia L.

Richardson Mts.: West of Mackenzie Delta, *6797.*

New to the flora of the Northwest Territories.

Arenaria macrocarpa Pursh.

Arctic Coast of Yukon Territory: King Pt., *7134A, 7174,* rare or occasional. Thus far not recorded from east of the Mackenzie.

Arenaria nardifolia Ledeb.

Mackenzie River Delta: East Branch, *7269;* Richards Isl., *2079, 2206;* Kittigazuit, *2481;* Arctic Coast: Atkinson Pt., *2598;* Liverpool Bay, *2872;* Great Bear Lake: Dease Arm, *4835;* Smith Arm, *4999, 5076;* McTavish Arm, *3624.*

Common in dry places eastward to Great Bear Lake.

Arenaria obtusiloba (Rydb.) Fern.

Richardson Mts.: West of Mackenzie Delta, *6795;* Mackenzie River Delta: Campbell Lake, *1912, 1989;* East Branch, *7267, 7268.*

New to the flora of the Northwest Territories.

Arenaria Rossii R. Br.

Richardson Mts.: West of Mackenzie Delta, *6659, 6792, 6793A;* Arctic Coast: Dolphin & Union Strait, Young Pt., *C. A. E. 367B* (as *Sagina* sp.); Bernard Harbor, *C. A. E. 267* (as *Alsine verna* Bartl. var. *rubella* (Wahlenb.) Lange, Macoun & Holm in Rept. Can. Arct. Exp. **5A**: 12. 1921).

Arenaria sajanensis Willd.

Richardson Mts.: West of Mackenzie Delta, *6794, 7333* (western limit); Great Bear Lake: Numerous collections; Keewatin Distr.: Kazan R., *5794;* Tha-anne R., *5575.*

An eastern species, apparently common west to the Mackenzie. New to the Mackenzie District.

Arenaria uliginosa Schleich.

GREAT BEAR LAKE: Smith Arm, *5077;* Cape McDonnel, *5140;* McTavish Arm, *3655;* KEEWATIN DISTR.: Kazan R., *5759A, 6629;* Mistake Bay, *5661.*

New to the Mackenzie and Keewatin Districts.

Cerastium alpinum L.

Contrary to some writers who have stated that *C. alpinum* is circumpolar, in North America it appears to reach west only to the 120th meridian, where it is replaced by *C. Beeringianum* Cham. & Schlecht.

Cerastium arvense L.

MACKENZIE RIVER DELTA: Campbell Lake, *1987; Stringer 14257, 62271* (Can); GREAT BEAR LAKE: Dease Arm, *4803.*

New to the flora of the Northwest Territories.

Sagina intermedia Fenzl.

ARCTIC COAST OF YUKON TERRITORY: *7099;* MACKENZIE RIVER DELTA: Kittigazuit, *2482;* ARCTIC COAST: Cape Dalhousie, *2747.*

New to the flora of the Mackenzie District.

Sagina nodosa (L.) Fenzl.

GREAT BEAR LAKE: McTavish Arm, *5175;* KEEWATIN DISTR.: Baker Lake, *6119.*

New to the Mackenzie and Keewatin Districts.

Silene repens Patr. in Pers. Syn. **1:** 500. 1805.

Silene purpurata Greene, Pitt. **2:** 229. 1892.

RICHARDSON MTS.: West of Mackenzie Delta, *6791;* MACKENZIE RIVER DELTA: East Branch, *7026;* Richards Isl., *2085, 7068, 7270;* ESKIMO LAKE BASIN: *3028.*

Silene repens is rare or occasional in sandy places east to the Eskimo Lakes. It is one of the few truly western species that have crossed the Mackenzie River. New to the flora of the District.

Melandrium (Wahlbergella)

Much has been written in the past, by students of arctic plants, on the taxonomic status of this notoriously critical genus and its members, and it is not without a feeling of presumption that the writer embarks upon a treatment of the American arctic and boreal members of the group. While in the eastern American Arctic the problems, if not simple, at least are limited to a few species, in the far Northwest matters become more complicated and the writer finds that he cannot conscientiously "lump" the numerous entities found there with the apparently still insufficiently understood "eastern" or circumpolar species.

Although most American authors (except Rydberg) maintain *Melandrium* (*Wahlbergella*) in the somewhat heterogeneous or "roomy" genus *Lychnis,* the writer, without offering any new argument in favour of the admittedly slight distinguishing features, prefers to follow the European authors who, with few exceptions, have long maintained *Silene, Melandrium, Viscaria, Lychnis,* and *Agrostemma* as separate genera in the tribe Lychnideae. A. T. Tolmatchev (Trav. Mus. Bot. Acad. Sci. U. R. S. S. **24.** 1932) has given what appears a most satisfactory treatment of the genus in Eurasia, and in Komarov's Fl. U. R. S. S. (**6:** 714–723. 1936) he has treated the Section *Gastrolychnis,* giving what seem workable keys and descriptions of 13 species occurring in the Soviet Union.

From the discussion in some recent papers (Polunin, l. c., 180–186; Th. Sørensen, Medd. om Grønland **101**[3]: 26–33. 1933; P. Gelting, ibid. **101**[2]: 47. 1934), it would appear that even the long-known East American species of *Melandrium* are not well-understood. Due to the numerous edaphic or ecological variations so common in this genus, herbarium material especially is not always easy to interpret if mature seeds are lacking. The writer is very familiar with *M. affine, M. triflorum,* and *M. apetalum,* which, in West Greenland, at the Danish Arctic Station at Godhavn, he has grown from seed and observed for many years in cultivation as well as in the field. He has also seen and studied the genus in the field from Labrador to Alaska. From mountains of the west he has seen the material of *Melandrium* in the Gray Herbarium and in the National Herbarium of Canada, but, lacking field experience with the genus in the Rocky Mountains, he prefers to limit the following treatment to the arctic and subarctic plants.

While it is realized that some ecological or edaphic forms, if without mature seeds, may not fit into the following key, it is offered, nevertheless, in the hope that it may be of service in all but extreme cases.

An excellent key to *M. affine, M. triflorum,* and *M. apetalum* is given by Abromeit in Bibl. Bot. **8** [Heft 42[2]]: 15. 1899.

Key to Melandrium in arctic North America

A. Seeds large, 1.5–2.4 mm. across, with conspicuously inflated wing; calyx, at least in anthesis, conspicuously inflated.
  B. Seeds 1.8 mm. or over; calyx much inflated; petals barely exserted.
    C. Flowers solitary (very rarely two), nodding throughout anthesis and erect only when capsule is mature; calyx thin, papery, dark purple, puberulent, glutinous, almost globular; petals purple (wet places: circumpolar, arctic) ..... *M. apetalum.*
    C. Flowers 1 or 2, lateral, long-peduncled; calyx pubescent, urceolate; petals pale rose (alpine gravelly slopes, Norton Sd., Alaska) ..... *M. macrospermum.*
  B. Seeds less than 1.8 mm. across; petals much exserted, 1½ to 2 times as long as the calyx.
    D. Perennial; stems erect, stiff, often purplish above, 15–25 cm. high; cauline leaves linear-obtuse, smaller than the basal leaves; calyx mostly dark purple, urceolate in fruit, 1–1.6 cm. long and 0.6–0.8 cm. in diam.; petals milky white (circumpolar, arctic) ..... *M. affine.*
    D. Short-lived perennial; stems green throughout, slender, more or less fractiflexed at the nodes, 30–50 cm. high; cauline leaves well-developed, attenuate; flowers few, long-peduncled; calyx green, campanulate, in fruit 0.6–0.8 cm. long, 0.6–0.7 cm. in diam.; petals rose; seeds small, cuneate, with a narrow wing (riverbanks; Yukon—Mackenzie R.) ..... *M. Taylorae.*
A. Seeds small, 1 mm. or less in diam., wingless; calyx in anthesis scarcely or at least not conspicuously inflated.
  E. Fruiting calyx cylindric, with green nerves; inflorescence many-flowered, the flowers on long, conspicuously appressed pedicels; plant tall, stiffly erect (plains: Sask.—Rocky Mts., north to Mack.) ..... *M. Drummondii.*
  E. Fruiting calyx urceolate; inflorescence few-flowered.
    F. Seeds cordate or reniform in outline, strongly tuberculate; stems robust, erect-ascending, mostly dark purple above; flowers sessile or very short-peduncled (endemic of Greenland) ..... *M. triflorum.*
    F. Seeds angular, more or less prismatic, merely granulate or rugose; stems erect, green throughout, rather weak; basal leaves soon withering; flowers pedunculate (Mackenzie Delta—Arctic Coast; Siberia) ..... *M. taimyrense.*
  E. Fruiting calyx narrowly campanulate; seeds somewhat lustrous, dark brown, granulate at least on the dorsal side; stems ascending, 1- to several-flowered (dry limestone ledges; endemic of Great Bear Lake) ..... *M. Ostenfeldii.*

Melandrium apetalum (L.) Fenzl in Ledeb. Fl. Ross. **1:** 326. 1842.

Lychnis apetala L. Sp. Pl. 437. 1753; Fl. Dan. **5:** *tab. 806.* 1781.

Lychnis montana Wats. in Proc. Am. Acad. **12:** 247. 1877.

Lychnis attenuata Farr in Contr. Bot. Lab. Pa. **2:** 419. 1904.

Lychnis nesophila Holm in Rep. Sp. Nov. **3:** 338. 1907.

To the full discussion recently given by Polunin (l. c., 184–186), the writer has little to add beyond that *M. apetalum,* unlike the other species, is invariably found in moist places, such as wet tundra, moist meadows, or even in grassy places bordering brackish lagoons, in wet moss by alpine streams, or in wet clayey places on moraines almost to the snow line. The flowers are solitary, or very rarely there is a weakly developed second flower from the upper node, nodding in anthesis and erect only when the capsules open. The stems are weak and often somewhat flexuous. It is so well-marked that confusion with other species seems scarcely possible. Simmons (Phytogeogr. Arct. Am. Arch. 84. 1913) and later Polunin, l. c., have pointed out that *L. nesophila* Holm is merely an extreme and abnormal variation. *Lychnis montana* Wats. and *L. attenuata* Farr seem very near *M. apetalum* (L.) Fenzl. The first is said to have the flowers erect or slightly nodding in anthesis; the latter seems scarcely distinguishable.

Distribution: Common across arctic North America, south to the tree line, north to Ellesmere Island; high mountains of Alta., B. C., and Yukon; W. Greenland south to Disco Bay; E. Greenland south to Scoresby Sound.

General Distribution: Circumpolar (not in Iceland), arctic-alpine.

Melandrium macrospermum A. E. Porsild in Rhodora **41:** 225, *tab. 552, fig. 1–3.* 1939.

Known thus far only from the type locality: Alaska: Norton Sound, volcanic hills back of Unalaklet, *A. E. & R. T. Porsild 1147.*

Melandrium affine J. Vahl in Fl. Dan. **14:** 5. 1843.

Melandrium pauciflorum (Ledeb.) Ostenf. in Medd. om Grønl. **65:** 173. 1923. nomen confusum.

Lychnis affinis J. Vahl in Fries, Mant. **3:** 36. 1842; Fl. Dan. **13:** *tab. 2173.* 1836 (sub nom. *L. triflora*).

Lychnis furcata Fern. in Rhodora **34:** 22. 1932, non *Viscago furcata* Raf. Autikon Botanikon 28. 1840.

Lychnis affinis Fries, Polunin, Bot. Can. E. Arct. 183. 1940.

Lychnis ? Kingii Wats. in Proc. Am. Acad. **12:** 247. 1877.

Lychnis triflora Sommerf. in Mag. f. Naturv. **2**[1]**:** 151. 1824, non R. Br.

Rafinesque, l. c., in 1840, described a plant from "Labrador and Hudson Bay" under *Viscago furcata,* which Fernald, l. c., takes to be *Melandrium affine* J. Vahl (1843), and for which he substitutes the combination *Lychnis furcata* (Raf.) Fern. to cover the plant of Greenland and N. America (but not that of Europe). Rafinesque's plant, however, cannot have been a *Lychnis* (*Melandrium*), for Rafinesque, according to Fernald, l. c., says: "Remarkably like the last plant [*Physocarpon vespertinum* Raf., based upon *Lychnis vespertina* Sibth.], but a real Silene not dioical and with 3 styles, smaller 4 to 6 inches high, calix and petals shorter, incarnate." Rafinesque's plant then is a true *Silene* and not a *Melandrium,* nor a *Lychnis* in the restricted sense (*Gastrolychnis*), both of which have five styles.

Fernald's second suggestion that Vahl's plant from Greenland (and also that of N. America) differs from Fries' plant from Scandinavia seems hardly tenable in the light of more detailed historical data. This history is briefly as follows (notes kindly supplied by Dr. Morten P. Porsild).

Lychnis triflora was mentioned by name (Ross' Voy. Disc. App. p. 142. 1819), but not properly described, by Robert Brown, from poor material from N. W. Greenland. The Norwegian botanist, S. C. Sommerfeldt, in 1824, described a plant under that name collected at Godhavn, Greenland, by his friend Schwabe, Governor of North Greenland, taking it to be Robert Brown's plant because its 3-flowered inflorescence suggested this and because it was clearly not one of the two species of *"Lychnis"* (*Melandrium apetalum* and *Viscaria alpina*) then known from Greenland. *Melandrium* (*Lychnis*) *triflorum*, however, does not grow at Godhavn proper, where Schwabe most likely made his collection, whereas *M. affine* is very common there. Sommerfeldt's plant is undoubtedly *M. affine*, and the first unequivocal description of true *M. triflorum* was by J. Vahl in Fl. Dan. (1843). Jens Vahl, from 1828 to 1832, traveled extensively in S. W. Greenland, where he had been specifically instructed by Hornemann to secure materials for Flora Danica. But not until 1833, when Vahl came to North Greenland, did he see any *Melandrium*. At Godhavn he at once collected what he also thought was Brown's *"Lychnis triflora,"* and a beautiful plate of this plant was in due course published under that name by Hornemann, Fl. Dan. **13**: *tab. 2173*. 1836. When Vahl visited the east coast of Disco Island and the Nugssuaq Peninsula, he realized that there was still another plant which at last was the real *"Lychnis triflora"* of Brown. The Godhavn plant which had been illustrated in Flora Danica (*tab. 2173*) erroneously as *Lychnis triflora*, was by Vahl (in his unpublished manuscript and field notes preserved in Copenhagen) then called *"affine,"* thereby suggesting a close "affinity." Later, in 1843, J. Vahl himself published and edited Fl. Dan. (*tab. 2356*), showing the true *Melandrium triflorum* (R. Br.) J. Vahl, and correcting the earlier mistake in a footnote which reads: "Obs. L. triflora Fl. Dan. *t. 2170* [obviously a misprint for *2173*] est Melandrium affine J. Vahl msc. (seminibus—reticulatis marginatis, marginibus inflatis)."

Lange (Nomenclator Fl. Dan. 137. 1887) later repeated this correction. Vahl did not then redescribe the plant, which, in his field notes in Greenland, he had called *"affine,"* because his friend Elias Fries (Mantissa **3**: 36. 1842) had already done it for him the year before.

From 1838 to 1839, J. Vahl joined Gaimard's Expedition to Spitsbergen. He left the expedition in 1839 at the small town Bosekop in Alten Fiord (Finmark District of northern Norway), where he spent some time before returning to Copenhagen. Here, on the banks of Alten River, Vahl rediscovered his new species of *Melandrium* from Greenland, and specimens from his collection are in the Copenhagen herbarium. While at Bosekop, Vahl undoubtedly met the botanist Laestadius, who was a missionary or minister to the Laps, and who lived and worked not far from there. He already knew Vahl's plant and had named it *Lychnis Dorothea* in honour of its original local collector, Vahl's hostess at Bosekop, Madame Dorothea Klerck. Part of Laestadius' type, which he gave to Vahl, is in Copenhagen and bears the following inscription on the label: "Lychnis Dorothea. Florens Alten Mad. Klerck legit. Obs. an vera Lychnis affinis tua est? Si habes parva specimina mittas. Tue Lychnis affinis habet calicem valde inflatam."

The plants cited by Elias Fries, l. c., therefore, are those collected "ad Alten Finmarkiae" by Laestadius and J. Vahl, not by his father Martin Vahl as suggested by Fernald, l. c. Martin Vahl's journey to Lapland took place in 1787–88, and he died on December 24, 1804, at Copenhagen (See O. Dahl, in Nyt Maga-

zin f. Naturvidensk. 59. 1921). Fries maintained a close correspondence with both Laestadius and J. Vahl and it was clearly his intention to describe J. Vahl's plant. His citation of J. Vahl's "Fl. Gr. Msc." proves that Fries accepted the latter's view that the plant of Greenland and Lapland belonged to the same species rather than that he (Fries) made a "misidentification of the Greenland plant of J. Vahl" (Fernald, l. c.).

The writer is unable to see any consistent differences between the plant of northern Scandinavia and that of Greenland and N. America. Except in the seed character, *M. affine* is subject to variations according to habitat. The differences given by Fernald, l. c., in his comparative description of *Lychnis furcata* and *L. affinis* are not very large and all seem to be within the normal range of variation in this species. The seeds illustrated by Fernald (*figs. 5* and *6*) vary somewhat in shape, but in size, texture, and width of wing they are really quite alike. *Figure 3,* showing a flowering calyx from Torne Lapmark, is not typical *M. affine* but probably *M. affine* ssp. *angustiflorum* (Rupr.) Tolm.

Fernald's suggestion that the plant of N. Scandinavia is distinct from that of Greenland and N. America is further weakened by the fact that Polunin, l. c., reports, under *Lychnis affinis* Fries, a plant collected by him on the west coast of Hudson Bay (Churchill), "inseparable from examples of this species gathered in northern Scandinavia, as Professor Fernald was kind enough to confirm for me." The Churchill plant, of which the writer, in 1930, collected abundant material, and of which he has seen several other collections, approaches *M. Taylorae* (Robins.) Tolm. in its small, greenish-striped fruiting calyces and in the exceptionally well developed cauline leaves, but its seeds are indistinguishable from those of *M. affine*. Near it, on drier ground, grew typical *M. affine*.

Melandrium affine is normally found in not too wet sandy or gravelly places near the seashore, on lake and river banks, and on rocky ledges. It does rather well in cultivation and responds generously to fertilizers.

Distribution: Rare or occasional in northern Alaska and on mountains of the interior; common across arctic Canada, south to the tree-line, north to Ellesmere Isl.; in mountains of western United States ("*Lychnis Kingii* Wats.") and Canada; common in west Greenland south to 65° 38′ N., and on the east coast south to 69° 30′ N.

General Distribution: Circumpolar (not in Iceland), arctic-alpine.

Melandrium Taylorae (Robins.) Tolmatchev in Trav. Mus. Bot. Acad. Sci. U. R. S. S. **24:** 267. 1932.

Lychnis Taylorae Robins. in Proc. Am. Acad. **28:** 150. 1893.

Lychnis affinis sensu Polunin, Bot. Can. E. Arct. 183. 1940, non Fries.

To Robinson's short but very clear description it may be added that *M. Taylorae,* unlike the other species treated here, is a "short-lived perennial" which generally dies after the second flowering. The weak, fractiflexed or "zig-zag" stem, as well as the calyx, are viscid with short, glandular hairs; the basal leaves are lanceolate, short-petiolate, glabrate to almost glabrous except for the soft ciliation of the margins; the stem leaves are well-developed and attenuate. The lower flowers are borne on long peduncles and are nodding when young; the capsule is very short, less than 1 cm. long, and almost as wide. The seeds are small, triangular or wedge-shaped in outline, with a narrow but distinct wing, wrinkled but not granulate or tuberculate.

Melandrium Taylorae, by its very short capsules, long fruiting peduncles, and the very characteristic seeds, is well-distinguished from *M. affine*. Polunin, l. c., who had perhaps seen only the type (a poor specimen), or who had been

misled by Ostenfeld, who annotated it "*L. pauciflora* Ledeb." without giving his reasons, reduced it to synonymy under *L. affinis* Fries.

MACKENZIE RIVER DELTA: Dry slopes, Peel River, July 15, 1892, *Miss E. Taylor* (TYPE, G), *2647* (isotype, Can); north end of Richards Isl., *2212;* south end of Richards Isl., *2084;* ARCTIC COAST: Tuktuayaktoq, *7418;* MACKENZIE RIVER: Arctic Red River, *Dutilly 16* (G); GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3492;* Bear River, *3266;* YUKON TERRITORY: Klondike River, *John Macoun 58402* (Can), distr. as *Lychnis triflora* var. *Dawsoni* Robins.; Coal Creek Hill, *F. Funston 81* (G, US); Bonanza Creek, *A. Eastwood 195,* distr. as *L. triflora* (G); ALASKA: Kowak R., N. Alaska, *McLennan,* in 1884 (G); Eagle Camp (centr. Alaska), *E. Scamman 699* (G); International Boundary, 65° 30′ N., 141° W., *Mertie 35* (US).

General Distribution: Arctic Coast from N. W. Alaska to a short distance east of the Mackenzie Delta, south to Great Bear Lake, lower Mackenzie River, Central Yukon and Alaska. *Melandrium Taylorae* generally grows in sandy or loamy soil on river and lake shores, or sometimes in rather dry meadows or in open copses.

Melandrium Drummondii (Wats.) comb. nov.

Lychnis Drummondii Wats. in Bot. King Exp. 37. 1871.

? Silene Drummondii Hook. Fl. Bor.-Am. **1:** 89. 1830.

Distribution: Prairies and plains from Manitoba to British Columbia and southward, north to Lake Athabaska.

Melandrium triflorum (R. Br.) J. Vahl, Fl. Dan. **14:** *tab. 2356.* 1843.

Lychnis triflora R. Br. in Ross' Voy. Disc. App. 142. 1819.

Vahl's brief but very lucid description and the beautiful plate in Fl. Dan., l. c., show that this plant is abundantly distinct from *M. affine,* and the difficulty experienced by some investigators, e. g., Sørenson, l. c., in E. Greenland may indicate that true *M. triflorum* is rare there. As far as the writer is aware, all records from America have proved erroneous, and he agrees with Simmons (Vasc. Pl. Ellesmereland 126. 1906), notwithstanding Polunin, l. c., that *M. triflorum* must still be considered an endemic of Greenland. *Melandrium triflorum* is related to *M. Ostenfeldii, M. Drummondii,* and *M. taimyrense* in the West.

Distribution: W. Greenland south to 65° 40′; E. Greenland south to 70° 30′.

Melandrium taimyrense A. Tolmatchev in Trav. Mus. Bot. Acad. Sci. U. R. S. S. **24:** 264, *fig. 7.* 1932.

Stems strict, simple or branching, erect, hoary-villous, 16–25 cm. high. Leaves linear, about 6 cm. long, somewhat obtuse, canescent-hirsute. Flowers mostly 2 to 4, rarely solitary, calyx dark-lined, covered with grandular white hairs. Corolla white (or pale rose?), slightly longer than the calyx, the petals emarginate. Seeds rugose, somewhat granulate, yellowish brown (the writer's translation from the original).

The writer has seen an isotype, from Taimyr Peninsula, 74° 50′ N., 106° E., Aug. 13, 1928, *A. Tolmatchev 765* (in Herb. M. P. Porsild). It is in fruit and is perfectly matched by fruiting specimens in the writer's collection. To Tolmatchev's description it may be added that the flowering calyx is narrow, about half as wide as long, much smaller and narrower than in *M. affine* or *M. triflorum.* The petals of the flowering plant, of which Tolmatchev apparently did not have material, are actually considerably exserted. The young plants are gray, hoary-canescent with a short, dense pubescence. The basal leaves tend to become glabrescent in age and often wither even before the capsules open.

MACKENZIE RIVER DELTA: Limestone hills N. of Campbell Lake, *1913;* Campbell Lake Seagull Cliff, dry gravelly limestone slopes, *1988;* East Branch, dry riverbanks, *7025,* ARCTIC COAST: 6 miles east of Kittigazuit, wet clay, *2475;* Atkinson Pt., *2597;* Cape Dal

housie, *2744;* GREAT BEAR LAKE: North shore of Dease Bay, *4691;* KEEWATIN DISTR.: West branch of Thelon R., 63° N., July 5, 1900, *J. W. Tyrrell 23143* (Can).

Distribution: Sandy and gravelly places, from the Mackenzie Delta east to Thelon R., south to the north shore of Great Bear Lake.

General Distribution: Taimyr Pen., N. W. Siberia; Arctic, Mackenzie and Keewatin.

Melandrium Ostenfeldii sp. nov.

Herba caespitulosa e radice multicipite crassa ascendens, innovationibus numerosis sterilibus rosulatis; culmi 20–30 cm. alti, tenues, plus minusve divaricati aut ascendentes, nodis saepe geniculati, foliorum paribus 1 vel 2, saepius diminutorum, facie lineari-obtusa praediti, pubescentia brevi glandulosa in toto vestiti; folia basalia lineari-spathulata aut sublanceolata dense breviter pubescentia, adulta glabrescentia, petiolis diu persistentibus; flores 1–8, plerumque 3 vel 4, erecti vel pedunculis subdivergentibus fulti; calyx campanulatus, 1 cm. brevior, glanduloso-viscosus, viridis cum lineis subobscuris purpurascentibus; petala alba quam calyce dimidio majora; semina minima, 0.8 × 0.6 mm. aut minora, angularia, subnitida, castanea, conspicue granulosa.

GREAT BEAR LAKE: Dease Arm, Narakay Isl., 66° 45′ N., 119° 30′ W., rocky ledges of diabase, Aug. 1, 1928, *A. E. & R. T. Porsild 4839* (TYPE); foot of Dease Arm, mouth of Dease R., *4802;* north shore, mouth of Haldane R., *5036;* McTavish Arm, east shore, *3777;* McTavish Arm, N. E. Fjord, *3676;* McTavish Arm, foot of Edna Travers Bay, *5218;* McTavish Arm, north shore, *5233;* south entrance to Conjuror Bay, *3623.*

Melandrium Ostenfeldii is known thus far only from pre-Cambrian rocks of the east shores of Great Bear Lake, where it is common on acid diabase and granite cliffs. It differs from *M. taimyrense* by its narrowly campanulate fruiting calyx and by its well-developed radical leaves that persist through the fruiting stage. It is no doubt related to *M. triflorum,* but, like that in *M. taimyrense,* the flowering calyx is much narrower and the seeds are smaller and granulate rather than tuberculate.

Stellaria calycantha (Ledeb.) Bong.

MACKENZIE RIVER DELTA: East Branch, *6541, 7266;* ESKIMO LAKE BASIN: Setidgi Lake, *3144, 3178;* GREAT BEAR LAKE: Keith Arm, *3465;* Etacho Pt., *3489;* McTavish Arm, *3894;* north shore, *5232.*

Somewhat rare, due to scarcity of suitable habitats, north to the limit of trees or slightly beyond.

Stellaria crassifolia Ehrh.

Represented by many numbers in the writer's collection, from Herschel Island to the west shore of Hudson Bay. Near its northern limit on the Arctic Coast, *S. crassifolia,* perhaps normally, does not produce fruit but is propagated by winter buds. New to the flora of the Mackenzie District.

NYMPHAEACEAE

Nuphar variegatum Engelm.

ESKIMO LAKE BASIN: Setidgi Lake, *3704,* fruiting abundantly; McTavish Bay, east shore, *3704.*

Previously known in our region north to Great Bear Lake, where it is fairly common.

RANUNCULACEAE

Caltha natans Pall.

KEEWATIN DISTR.: Lake on Tha-anne R., 60° 58′ N., 97° W., *5502.*

New to the flora of the Northwest Territories.

Anemone narcissiflora L.

RICHARDSON MTS.: West of Mackenzie Delta, *6588, 6665, 6807, 7334.*

Common in alpine meadows above the timber line. New to the flora of the Northwest Territories.

Ranunculus acris L. var. **frigidus** Regel.

Ranunculus occidentalis Nutt. var. *robustus* Gray, Ostenf. in Gjöa Exp. 46. 1909; Macoun & Holm in Rept. Can. Arct. Exp. **5A:** 13. 1921.

RICHARDSON MTS.: *6591, 6810,* above the timber line.

Common along the Arctic Coast and in mountains west of the Mackenzie Delta. Our plant is 20–30 cm. high and perfectly glabrous except just below the flower. The flowers are very large, 2 to 3 cm. in diameter; the petals are obovate and very shiny. The achenes are large with a prominently hooked, persistent style.

Ranunculus circinatus Sibth.

? Ranunculus subrigidus Drew in Rhodora **38:** 39. 1936.

MACKENZIE RIVER DELTA: East Branch, 68° 40′ N., in 2–3 feet of water, *7248.*

The writer is unable to find any characters wherein the American plant differs from that of the Old World. The flowers, which are larger than in *R. trichophyllus* Chaix, are emerged during anthesis. Also it is later-flowering than that species. In the Mackenzie Delta it does not flower or mature fruit except in favorable seasons. New to the flora of the Northwest Territories.

Ranunculus gelidus Karelin & Kirilow in Bull. Soc. Bot. Mosc. **15:** 133. 1842.

For complete nomenclature of this rare plant see Ostenf. in Gjöa Exp. 44. 1909. To the synonyms given there should be added *R. Grayi* Britton, in Bull. Torr. Bot. Cl. **18:** 265. 1891, based upon *R. pedatifidus* Hook. Fl. Bor.-Am. **1:** 18, *tab. 8B.* 1829, non Sm.

The Gjöa Expedition collection came from King Point on the Arctic Coast of Yukon Territory. Abundant material was collected on the Richardson Mts.: West of Mackenzie Delta, 68° N., 136° W., on alpine peak, 4000′ elev., *6666.*

Ostenfeld, l. c., has shown that the plant so well-described and illustrated by Hooker, l. c., from specimens collected by Drummond in the Canadian Rockies, cannot be kept apart from Karelin & Kirilow's plant from the Alatau Mountains of Central Asia. In his recent treatment, Benson (in Bull. Torr. Bot. Cl. **68:** 657. 1941) apparently has overlooked Ostenfeld's discussion, and he maintains the plant under *R. Grayi,* stating that it is related to *R. Eschscholtzii.* The writer again is inclined to agree with Ostenfeld, who states that it belongs "to the *auriconus*-group, as also *R. affinis* and *R. pedatifidus.*"

Our specimens grew in moist gravel with *Douglasia arctica.* On July 10th the achenes were mature and but a single flower remained. The petals are small, 4–5 mm. long, pale yellow, and barely exceeding the sepals. The flowering stems are 6–10 cm. high, somewhat arcuate; the peduncles are villous. The leaves are glabrous and glaucous, the old leaf-bases persistent and strongly fibrous, as are the strongly developed roots. The achenes are glabrous, light green, 2 to 2.4 mm. in diam., orbicular, flattened; the style is lateral, short-hooked, not at all as figured by Hooker's *Fig. 1,* drawn from immature material.

Ranunculus Pallasii Schlecht.

ARCTIC COAST OF YUKON TERRITORY: Shingle Pt., *6905;* MACKENZIE RIVER DELTA: North end of Richards Isl., *2218;* ARCTIC COAST: Tuktuayaktoq, *7419;* Atkinson Pt., *2612;* Liverpool Bay, *3104;* ESKIMO LAKE BASIN: *2985, 3104.*

Common in wet brackish marshes along the Arctic Coast east to Anderson River, often together with *Hippuris vulgaris*. The very showy, pure white or pale rose flowers are very fragrant. The plants blossom throughout the season, and flowers and mature fruits may be seen together. It seems very strange that such a keen observer as Richardson failed to observe this very conspicuous plant. It is unrecorded from Canada west of Hudson Bay, but it is common in arctic parts of Alaska.

Ranunculus trichophyllus Chaix var. **eradicatus** (Laestad.) Drew.

Mackenzie River Delta: Very common; Kittigazuit, *2489;* Eskimo Lake Basin: *3179;* Great Bear Lake: North shore, *5038;* Dease Arm, *4695;* McTavish Arm, *5270;* Keewatin Distr.: Kazan R., *6036.*

The var. *eradicatus* seems always to prefer deeper water than var. *typicus*. In the Mackenzie Delta and at Great Bear Lake it was often observed to form a dense growth, flowering and fruiting abundantly, on the bottoms of lakes 10 to 12 feet deep. The flowers barely open and may be cleistogamous. In rapids of the Kazan River, in water 4 to 8 feet deep, it was likewise observed to flower and fruit.

Ranunculus trichophyllus Chaix var. **hispidulus** Drew.

Great Bear Lake: McTavish Arm, north shore, in a shallow, marshy slough, *5299.*

Ranunculus trichophyllus Chaix var. **typicus** Drew.

Mackenzie River Delta: East Branch, *6919;* Eskimo Lake Basin: North shore of 2nd lake, *2983, 2984.*

Much less common than var. *eradicatus* and perhaps restricted to shallow, calcareous lakes.

PAPAVERACEAE

Papaver alaskanum Hultén.

Rare or occasional along the Arctic Coast east to Cape Bathurst. In most of the collections the flowers are sterile, i.e., the anthers are well-developed but the ovary is abortive. Where fertile flowers occur the immature capsules are frequently eaten by ground squirrels (*Citellus parryi*).

Papaver microcarpum DC.

Richardson Mts.: West of Mackenzie Delta, alpine tundra, above timber line, *6669, 6813–6815* (the last is f. *albiflora*); Arctic Coast of Yukon Territory: King Pt., *7179;* Shingle Pt., *Can. Arct. Exp. 180* (distr. as *P. nudicaule* L.); Mackenzie River: Ft. Norman, *G. Hume 103443* (Can).

Papaver microcarpum is apparently common in the mountains of Yukon Territory but does not reach east of the Mackenzie.

Papaver radicatum Rottb.

Great Bear Lake: Cape McDonnel, *5143;* McTavish Arm, north shore, *5235;* east shore, *3781.*

Papaver radicatum is the common species of eastern Arctic America and the Arctic Archipelago. It reaches west to Great Bear Lake and Cape Bathurst. West of Great Bear Lake it is replaced by the closely related *P. alaskanum,* which may perhaps be considered a western race. (See Porsild in Rhodora **41**: 230–231, 1939).

CRUCIFERAE

Subularia aquatica L.

Great Bear Lake: McTavish Arm, *3696;* Keewatin Distr.: Lake on Tha-anne R., 60° 58′ N., 97° W., *6176.*

New to the flora of the Northwest Territories.

Thlaspi arcticum sp. nov.

Thlaspi montanum sensu Hook. Fl. Bor.-Am. 1: 58. 1830, non L.

Thlaspi alpestre L. var. *purpurascens* Ostenf. in Gjöa Exp. 47, *tab. 3. fig. 17.* 1910, quoad spec., non *T. purpurascens* Rydb. in Bull. Torr. Bot. Cl. **28**: 281. 1901.

Herba perennis, radice in caudice multicipite ramoso terminata; folia basalia subglauca, carnea, glabra, spathulata, integra, in petiolum laminae aequilongum sensim fastigiata, 1–2.5 cm. longa, 0.5–0.8 cm. lata, nervo medio prominente, nervis lateralibus inconspicuis; culmi floriferi singuli aut pauci, glabri, in anthesi 3–5 cm. alti, maturi valde elongati, 10–18 cm. alti; folia caulina 3–5, linearia, sessilia, basi truncata; inflorescentia capitata 2–25-flora, fructifera valde elongata, pedicellis valde divaricatis, longitudine siliquas aequantibus; petala alba, circa 4.5 mm. longa, unguiculata, nervosa, sepalis viridescentibus duplo longiora; filamenta brevia crassaque, antherae breves ellipsoideae; siliquae maturae 6–7 mm. longae, 2–2.5 mm. latae, subcurvatae, cuneato-clavatae, exalatae, obtusae vel apice subacutae, haud emarginatae, valvis valde carinatis; stylus filiformis, circa 1 mm. longus; septum incompletum scissura magna longitudinali instructum; seminibus 1.5–2 mm. longis, 0.8–1 mm. latis, levibus, brunneis.

Arctic coast and foothills west of Mackenzie Delta, west to Herschel Island.

Arctic Coast of Yukon Territory: Kay Pt., 69° 12′ N., 138° 30′ W., very rare on dry tundra ridges, July 23–25, 1934, *A. E. Porsild 7144* (type); King Pt. (about 138° 30′ W.), June 20–28, 1906, *Gjöa Exp.* (Copenhagen, Can); Herschel Isl., 69° 35′ N., July 18, 1906, *Gjöa Exp.* (Copenhagen); same place, 1893, *I. O. Stringer 14257* (Can), distributed as *Arabis lyrata* L. var. *ambigua.* Our specimens are in fruit, while those of the Gjöa Expedition are in anthesis.

Ostenfeld, l. c., suggests that the Gjöa Exp. plant is *T. purpurascens* Rydb., from high mountains of Colorado and Arizona. He reduces it to a variety of the European *T. alpestre,* which, however, as already pointed out by Rydberg, l. c., is not indigenous to North America. Furthermore, *T. alpestre* is not perennial; Thellung (in Hegi, Ill. Flora v. Mitteleuropa **4**[1]: 122) says of it: "Plant mostly bi- or triennial and, having once flowered it dies" (translation of Thellung's German text). *Thlaspi arcticum,* as well as all native *Thlaspi* of the Rocky Mountains, is perennial. In his revision of the genus, Payson (Univ. Wyom. Publ. Bot. **1**: 6. 1906) cites Hooker's Fl. Bor.-Am. but not Ostenfeld, l. c., and makes no reference to the arctic plant, nor does he appear to have seen specimens of it. *Thlaspi arcticum* differs from *T. purpurascens* and other related species by its much shorter style and few-leaved flowering stems; it is perhaps most closely related to *T. cochleariforme* DC., of mountains of western Siberia. One sheet in the Nat. Herb. of Canada: "Montes uralenses polares (lat. bor. 65° et 66° 30′), July 17, 1926, B. Gorodkov," distr. by Herb. Inst. Bot. Acad. Sci. U. R. S. S., differs from *T. arcticum* by the marcescent old leaf-bases, puberulent flowering stems, and the barely elongated fruiting raceme.

Rorippa obtusa (Nutt.) Britt.

Mackenzie River Delta: East Branch, riverbanks and meadows, *7225.*

New to the flora of the Northwest Territories.

Thellungiella salsuginea (Pall.) O. E. Schulz.

Sisymbrium salsugineum Pall. in Ledeb. Fl. Alt. 3: 145. 1831.

? Turritis diffusa Hook. Fl. Bor.-Am. 1: 41. 1829.

A single collection of what appears to be this rare species was made on the Arctic Coast, east of the Mackenzie, Liverpool Bay, *2891.* Our plant is apparently annual; it has clasping stem-leaves and entire radical leaves.

Cardamine digitata Richards. in Franklin's Journ. App. 743. 1823; Hook. Fl. Bor.-Am. **1**: 45. 1829, excl. pl. Bering Str.; Macoun & Holm in Rept. Can. Arct. Exp. **5A**: 14. 1921; Holm, ibid. **5B**: 37. 1922.

Cardamine hyperborea Schulz in Bot. Jahrb. **32**: 550. 1903, pro min. parte; Ostenf. in Gjöa Exp. 48. 1909; Simmons, Phytogeogr. Arct. Am. Arch. 91. 1913; Polunin, Bot. Can. E. Arct. 231. 1940. See Porsild in Trans. Roy. Soc. Can. 3rd. ser. sect. V, **32**: 31–32. 1938.

When Schulz, l. c., united the genus *Dentaria* Tourn. with *Cardamine* Tourn., because of *Dentaria digitata* Lam., it became necessary to rename *Cardamine digitata* Richards. But, as pointed out by Holm, l. c., there is very good authority for maintaining the genus *Dentaria* as distinct from *Cardamine*, and very few authors, indeed, have followed Schulz. Furthermore, as pointed out by the writer, l. c., Schulz appears to have misunderstood *C. digitata* Richards., and the plant which he discussed under *C. hyperborea* appears largely to have been *C. Blaisdellii* Eastw. of the Bering Sea region. Certainly the plant he described is not Richardson's plant at all.

Cardamine digitata Richards. still remains a very rare plant in most herbaria, and, as far as the writer is aware, it has never been illustrated. It is a plant of not-too-wet tundra, reaching south to the tree line, but apparently not truly arctic, since at Cape Dalhousie, in latitude 70° N., specimens were in beginning anthesis in the early half of August (*2766*). *Cardamine digitata* prefers rather dry, peaty soil and often grows on the sides of large "niggerheads." The slender rhizomes and the vegetative reproduction have been well described by Holm, l. c.; the rhizomes are deeply buried in the turf and can be dug out only with the greatest care. Fructification is poor, and as a rule but half of the ovaries are fertile. Mature siliques are 30 to 40 mm. long and 2 mm. wide, gradually tapering into a slender style 2 to 3 mm. long and containing from 5 to 8 seeds. The seeds are oval, somewhat flattened, 1.4 mm. long and 0.8 to 1 mm. wide, greyish-brown, smooth.

Richardson, l. c., is mistaken when he says of the color of the flowers: "alba vel purpureo tincta." The petals invariably are milky-white. Ostenfeld, l. c., has pointed out also that Richardson's description of the leaves, "folia digitatim pinnata," is incorrect and that the leaves actually are pinnate.

Cardamine digitata appears to be an endemic of North America, rare in northwestern Alaska, fairly common along the arctic coast of the Yukon and Mackenzie Districts east to Hudson Bay, north to Banks and Victoria Islands, and south to the tree line.

Alaska: Teller, *Walpole 1465, 1561, 1810, 1890* (US); Mendelhall, Dall R. trail, Dall Cy. (US); Arctic Coast of Yukon Territory: *7182;* Herschel Isl., *Can. Arct. Exp. 248;* Northwestern Yukon: 66° 02′ N., 141° W., *D. D. Cairnes 83045* (Can); Richardson Mts.: *6678;* Mackenzie Delta and Arctic Coast: numerous collections; Great Bear Lake: Dease Arm, *4736;* Cape McDonnel, *5146;* Keewatin Distr.: Kazan R., *5812;* Baker Lake, *6123;* Mistake Bay, *5672.*

Draba ? aurea M. Vahl.

Mackenzie River Delta: Campbell Lake, dry hillsides on limestone, *1995;* East Branch, sandy river banks, *6996.*

These two plants, except for the entirely white petals, are a perfect match for *D. aureiformis* Rydberg, considered by Fernald (in Rhodora **36**: 300. 1934) inseparable from *D. aurea* M. Vahl. By Mrs. E. Ekman both (in herb.) were named *D. Thomasii* Koch (*D. lanceolata* Royle), which most certainly they are not. The writer is very familiar with *D. aurea* in Greenland and in the East,

and it may be significant that in life this species did not suggest itself to him. Our specimens are biennial or at least appear to be hapaxanthic. The flowering stems are branching and the flowers white, the young siliques stellate-pubescent and the styles 1 mm. long and slender.

Draba crassifolia Grah.

MACKENZIE RIVER DELTA: North end of Richards Isl., *2238;* KEEWATIN DISTR.: Kazan River, 63° N., *6037.*

New to the flora of the Northwest Territories.

Draba incerta Payson.

Draba ? glacialis β Hook. Fl. Bor.-Am. **1**: 51. 1830.

GREAT BEAR LAKE: *J. M. Bell 22874* (Can).

In the Gray Herbarium is a Franklin Expedition plant labelled: "C[d]. H[s]. [Cumberland House] to Bear L.—R[ichardson]. June–Aug. Draba glacialis β." It is in anthesis, without fruit, but seems typical *D. incerta.* New to the flora of the Northwest Territories.

Draba luteola Greene.

GREAT BEAR LAKE: Keith Arm, *3460, 3462;* north shore, *4739, 4946, 5004;* McTavish Arm, *5272;* Leith Pt., south shore, *3580;* CORONATION GULF: *Can. Arct. Exp. 426* (unnamed); BRITISH COLUMBIA: Mt. Selwyn, 56° 01′ N., *H. M. Raup & E. C. Abbe 3915, 4104* (distr. as *D. borealis* DC.).

The material listed above is a good match for *D. luteola* Greene, otherwise known from Colorado and Utah. It is the plant which the late Mrs. E. Ekman (Sv. Bot. Tidskr. **28**: 80. 1934) called a hybrid: *D. aurea* × *daurica* and "probably also *Dr. arabisans* Michx." (Fernald, l. c., p. 251).

Our plant grew on sandy, calcareous beaches. In life the petals were white or creamy white, not yellow. In most of our material the lower part of the stem and basal leaves are tinged with purple.

Draba oligosperma Hook. Fl. Bor.-Am. **1**: 51. 1829.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3498;* McTavish Arm, east shore, greenstone hills, 900′ elev., *5302.*

Characteristic for this species is the very remarkable elongation of the inflorescence, which, as pointed out by Hooker, l. c., takes place as early as anthesis. So far as the writer is aware, this is not paralleled in any other of the dwarf arctic or boreal Drabas. Schulz incorrectly places *D. oligosperma* in the section *"Chrysodraba,"* describing the petals as being yellow ("flava"); Hooker correctly states that they are white ("petala alba"), but in drying they may turn a pale yellow. Part of Hooker's type, "Summit of limestone hill, Mack. R. 68° *Dr. Rich.,"* is in the Gray Herbarium. It is a somewhat more slender plant than the writer's.

Draba Palanderiana Kjellm. in Vega Exp. Vet. Iakt. **2**: 45. 1883.

RICHARDSON MTS.: West of Mackenzie Delta, gravelly slopes, 4000′ elev., *6595, 6671, 6673, 6675.*

This curious *Draba,* which is a close match for Kjellman's plant from Seward Pen., Alaska, was interpreted by the late Mrs. Ekman as *D. nivalis* × *pilosa.* It forms large, loose rosettes. The inflorescence is capitate in anthesis; the flowers large, white, but turning yellow in drying. The siliques are lanceolate, glabrous, with a long style. A specimen from the type locality, Teller [Port Clarence], Alaska, *Walpole 1402* (US), is 20 cm. in diam. with several hundred flowering scapes.

Draba praealta Greene, Pitt. **3**: 306. 1898.

GREAT BEAR LAKE: Smith Arm, *5003, 5005, 5006.*

New to the flora of the Northwest Territories.

Smelowskia calycina (Steph.) C. A. Mey.

RICHARDSON MTS.: West of Mackenzie Delta, barren alpine ridges, between 2000 and 3000′ elev., *6596, 6680, 6821.*

Although the plants flower profusely, the fruiting is very poor, and but a single silique, containing one good seed, could be found. Not previously recorded from the Northwest Territories.

Arabis Drummondi Gray.

RICHARDSON MTS.: West of Mackenzie Delta, *6819;* GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3494.*

New to the flora of the Northwest Territories.

Arabis Holboellii Hornem. See Rollins in Rhodora **43**: 440. 1941.

GREAT BEAR LAKE: Bear River, *3364;* Smith Arm, *5080;* McTavish Arm, east shore, *3705;* north shore, *5304.*

Our specimens are perennial and a perfect match for the plant in its type locality (Godhavn, Greenland), and they represent var. *typica* Rollins, recorded by him, l. c., in the far northwest, from Yukon and Alaska. New to the flora of the Northwest Territories.

Arabis Hookeri Lange.

MACKENZIE RIVER DELTA: Campbell Lake, *1920, 1921, 1994;* East Branch, *6892, 7395;* Richards Isl., *2089;* Kittigazuit, *2362;* ARCTIC COAST: Atkinson Pt., *2623;* GREAT BEAR LAKE: McTavish Arm, north shore, *5202;* east shore, *5305A.*

Our specimens are very much like the plant of Greenland and are all biennial. *Arabis Hookeri* flowers very early and our nos. *1920, 1921,* and *1994,* collected June 15–17, 1927, have almost mature siliques. As in Greenland, *A. Hookeri* is a pronounced calciphile and a dung-lover. In the Mackenzie District it is often found below bird cliffs and around the burrows of ground squirrels. The seeds are strongly mucilaginous when wet. The cotyledons are incumbent.

Arabis Hookeri is a rare plant in most American herbaria, and, since originally collected by Richardson on the "Shores of the Arctic Sea, between long. 107° and 130°," it has been collected and recorded but a few times from North America (Yukon) outside of Greenland. There can be little doubt, however, that another plant, *Halimolobos virgatus* (variously known under *Sisymbrium, Stenophragma, Pilosella, Arabidopsis*), is identical with it. The arctic plant also has been transferred to *Halimolobos* as *H. Hookeri* (Lange) Schulz. Rollins, l. c., who points out that the reason for this is chiefly the incumbent cotyledons, brings it back to the original specific name as *Halimolobos mollis* (Hook.) Rollins. While the transfer to *Halimolobos* may be justified, it is, nevertheless, interesting to note that another recent monographer of the genus points out that in *Arabis* the "cotyledons vary from accumbent to incumbent or they may be quite oblique" or even "accumbent and incumbent on the same plant" (Hopkins in Rhodora **39**: 72. 1937). Be this as it may, *Halimolobos virgatus,* with its host of "aliases," should be added to the synonyms of *A. Hookeri.*

Arabis lyrata L., Raup in Jour. Arn. Arb. **17**: 259. 1936.

GREAT BEAR LAKE: McTavish Arm, *3607, 3646, 3657, 3732, 5273.*

Raup, l. c., suggests that *Sisymbrium arabidoides* Hook., Fl. Bor.-Am. **1**: 63. 1830, "to Lat. 68°," is our plant. But Hooker, l. c., stresses the fact that his

plant is annual and has incumbent cotyledons. Our plant is glabrous throughout, is distinctly perennial, and has accumbent cotyledons.

Braya

Ostenfeld very properly stated that "there is much confusion concerning the arctic species of *Braya*" (Gjöa Exp. 17. 1909). One reason why this is so is that even in the Arctic these plants are rare and of a most peculiar and spotty distribution, suggesting special soil requirements. They are therefore not at all well represented in most herbaria. Four species were collected by members of the Franklin Expeditions and three were first described from our region.

Braya purpurascens (R. Br.) Bunge is perhaps the best-known and most widely distributed. Study of this species in cultivation is probably necessary in order to understand its relation to related species such as *B. Longii* Fern., *B. americana* (Hook.) Fern., and the very near *B. Thorild-Wulffii* Ostenf., as well as *B. purpurascens* var. *dubia*.

Braya glabella Richards. has been the cause of most of the misunderstanding and it has been interpreted in different ways by almost every writer who has dealt with it. Gelert (Bot. Tidsskr. **21**: 292. 1898), who examined the type in the British Museum, was the first to point out that, contrary to the opinion of most previous writers, *B. glabella* was quite distinct from *B. purpurascens*. He claimed also that it was inseparable from *B. alpina* Sternb. & Hoppe of Central Europe, Greenland, and northern Scandinavia.

Rouy (Ill. Pl. Eur. Rar. fasc. 11. 84, *tab. 254*. 1899), who apparently had not seen Richardson's type of *B. glabella*, considered it more closely related to *B. purpurascens* and quite distinct from the plant of Greenland and Scandinavia, for which he proposed the new name *B. linearis* Rouy. Ostenfeld, l. c., agreed with Rouy that the plant of Greenland and Scandinavia was distinct from *B. alpina* of Central Europe but thought that Gelert was correct when stating that the plant of Greenland and Scandinavia was inseparable from that of arctic America. Ostenfeld, therefore, correctly concluded that Rouy's name was superfluous and that Richardson's *B. glabella* must stand. Alm (in Acta Fl. Suec. **1**: 250–252. 1921), who again revised the group, came to the same conclusion. Schulz (in Pflanzenr. 86 (IV. **105**): 230. 1924), on the other hand, agreed with Rouy, saying about *B. glabella:* "haec species a *B. alpina* et *B. lineari* habitu robustiore et siliquis crassioribus distinguitur," thereby showing that he, after all, was perhaps not referring to Richardson's plant but to *B. pilosa* Hook., although he later reduced the latter to a "forma" of *B. purpurascens*.

Braya pilosa Hook. has been largely ignored and the writer was particularly pleased to secure abundant material in the fruiting stage from the type locality of what he considers must be *B. pilosa*.

Braya glabella Richards. in Franklin's Journ. App. 743. 1823; Hook. Fl. Bor.-Am. **1**: 65. 1830; Ostenf. in Gjöa Exp. 17. 1909; Alm in Acta Fl. Suec. **1**: 247–262, *tab. 16, figs. 4–7*. 1921.

Braya alpina Gelert, Bot. Tidsskr. **21**: 291, *fig. 2*. 1898, not Sternb. & Hoppe.

Braya linearis Rouy, Ill. Pl. Eur. Rar. fasc. 11. 84, *tab. 254*. 1899.

To Richardson's description it may be added that the whole plant is often tinged with purple. The stem, pedicels, and petioles (the blades only when young) are sparsely clothed with short, white, adpressed simple or bifurcated trichomes. In anthesis the inflorescence is capitate and barely exceeds the leaves; later a very considerable elongation takes place and fruiting specimens

are 15 to 20 cm. high. The mature siliques are 1 to 1.2 cm. long, on very short pedicels, almost terete, about 1.5 mm. in diameter. The style is short and conical in distinct continuation of the silique. The valves are glabrous and tinged with purple. Each cell contains from 10 to 14 dark brown seeds in two distinct rows. The seeds are oblong, pointed, about 1 mm. long, finely pebbled. The root is a weak tap-root, lasting only a few years.

Braya glabella flowers very early and specimens with mature fruits were collected on June 23–26, 1928. We saw this species but once, not far from the type locality (Copper Mts., north of Dismal Lakes).

GREAT BEAR LAKE: North shore of Dease Arm, *4698* (fruiting specimens), *4699* (flowering specimens from edge of snow bank).

General Distribution: Great Bear Lake, W. & E. Greenland and N. Scandinavia.

Braya humilis (C. A. Mey.) Robins. Syn. Fl. N. Am. **1:** 141. 1895.

Sisymbrium humile C. A. Mey. in Ledeb. Fl. Alt. **3:** 137. 1831, but first published in Hook. Fl. Bor.-Am. **1:** 62. 1830, credited to "Ledebour, MSS. ined."

Sisymbrium arabidoides Hook. Fl. Bor.-Am. **1:** 63, *tab. 21.* 1830, at least in part.

Pilosella Richardsonii Rydb. in Torreya **7:** 159. 1907.

Braya Richardsonii (Rydb.) Fern. in Rhodora **20:** 203. 1918.

Braya alpina sensu Macoun & Holm, Rept. Can. Arct. Exp. **5A:** 13. 1921, non Sternb. & Hoppe.

Braya glabella sensu Holm, Rept. Can. Arct. Exp. **5B:** 35. 1922, non Richards.

Meyer, l. c., states that the plant is biennial, while Hooker, l. c., says it is perennial. The latter view is correct with regard to our plant, but the root is weak and the plant usually dies after the second flowering.

Braya humilis is a variable species. On limestone cliffs along the Mackenzie there grows a gray-canescent, lilac-flowered plant which is Rydberg's *Pilosella Richardsonii* (in his Rocky Mt. Flora, p. 341, placed under *Arabidopsis* with the synonym *Sisymbrium humile* Hook., non Meyer). On the Arctic Coast the plant looks somewhat different and has slightly smaller and pure white flowers. This I suspect is at least in part what Hooker, l. c., called *Sisymbrium arabidoides* and which he illustrated in *tab. 21.*

MACKENZIE RIVER DELTA: Campbell Lake, *1991;* ARCTIC COAST: North end of Richards Isl., *2228, 2234, 2235;* Atkinson Pt., *2622;* Cape Dalhousie, *2761;* Liverpool Bay, *2890;* VICTORIA ISL.: *Can. Arct. Exp. 411* (distr. as *B. alpina*); GREAT BEAR LAKE: North shore, Haldane R., *5039;* McTavish Arm, north shore, *5177;* Bear River, Mt. Charles, *3294, 3331;* MACKENZIE RIVER: Bear Rock, near Ft. Norman, 1300′ elev., *3383.*

General Distribution: Circumpolar, arctic-boreal. Alaska, Yukon, Mackenzie south to Alberta, James Bay and southern Hudson Bay, Gulf of St. Lawrence, Newfoundland, E. & W. Greenland. Not in Iceland.

Braya pilosa Hook. Fl. Bor.-Am. **1:** 65, *tab. 17A.* 1830.

Braya purpurascens f. *pilosa* Schulz in Pflanzenreich 86(IV. **105**): 235. 1924.

There are in the National Herbarium of Canada two sheets of what is undoubtedly part of the type collection of *Braya pilosa* Hook. Both have labels written by J. M. Macoun. The first, *2179* (Can), reads: "Braya pilosa Hook. Sea shores, mouth of Mackenzie River, Lat. 70°, N. W. T. Richardson." It consists of a branching caudex bearing a flowering scape from each fork. The flowers are very large, with petals 7 mm. long. The other sheet, *2178* (Can), is labelled: "Braya alpina Sternb. & Hoppe var. glabella Wat. Sea shores between Mackenzie and Coppermine Rivers, N. W. T. Dr. Richardson." A second label is marked: "Ex. Herb. Musei Brittanica. Mouth of River Mackenzie Arctic North Coast. Dr. Richardson." The second plant shows a strong

tap-root branching into 11 caudices each bearing a flowering scape from 6 to 8 cm. high. The flowers are slightly smaller than in *2179* and the whole plant is more hirsute. It is a perfect match for Hooker's *plate 17A* and for his description of *B. pilosa.*

Fruiting specimens of what is undoubtedly *B. pilosa* were collected on the Arctic Coast east of the Mackenzie Delta, in the latitude of the type locality (latitude 70°) : North end of Richards Isl., *2229;* Atkinson Pt., *2621;* Cape Dalhousie, *2760;* Liverpool Bay, *2889.*

Our plant was at first taken to be *B. glabella,* but when later this plant was collected near its type locality the difference at once became apparent. The leaves, scapes, pedicels, and the valves of the mature silique in our plant are sparsely clothed with a short, soft pubescence of simple and bifurcated gray hairs. The whole plant is green and but very rarely tinged with purple. The inflorescence is elongated in fruit but less so than in *B. glabella.* Also the mature siliques are broader than in that species, distinctly broader below the middle and decidedly flattened, with a filiform style 1.2 to 1.5 mm. long. The seeds are similar to those of *B. glabella* but decidedly paler, 10 to 14 to each cell. Richardson observed that the flowers are very fragrant, comparing the "smell of the blossoms to that of Lilac."

Braya pilosa apparently flowers very early, and, although the writer diligently searched for them during several seasons spent near the Mackenzie Delta, he never succeeded in finding flowering specimens, the reason being that the Arctic Coast, where the plant grows, is almost inaccessible during the early part of the season due to ice conditions. Franklin's party reached the sea-coast on July 8, 1826, which must have been in an early season, for Richardson was able to proceed east along the coast unhindered by ice.

In 1928 the late Dr. M. O. Malte collected in the Hudson Strait region a *Braya* which he tentatively named *B. glabella* Richards. The Hudson Bay plant is definitely not *B. glabella* Richards. but is a close match for our material of *B. pilosa.* As in the west, it flowers very early and only fruiting specimens have been collected. Of the Hudson Bay plant the writer has seen the following collections: Northern Quebec: Wakeham Bay, *M. O. Malte 120191* (Can, G); Southampton Isl.: *M. O. Malte 120677* (Can, G).

On Baffin Island Malte collected another *Braya* which he called *B. purpurascens* Bunge (Lake Harbour, *M. O. Malte 120294,* Can, G). This differs from the Wakeham Bay and Southampton Island plants by the less elongated fruiting head, shorter and stouter styles, and by the shorter and more plump siliques. Polunin, l. c., also collected the latter plant at Lake Harbour (*1121,* Can), labelling it a variety of *B. purpurascens* (R. Br.) Bunge.

The writer has seen specimens of *B. purpurascens* from Greenland that are a close match for the Baffin Island plant (W. Greenland, Ingnerit Fj., 71° 7′ N., *M. P. & R. T. Porsild,* Can).

Braya pilosa Hook. no doubt is more closely related to *B. purpurascens* than to *B. glabella,* but, because of its early seasonal appearance and very large and fragrant flowers, much elongated fruiting racemes, long and slender styles, and erect habit of growth, it is considered abundantly distinct.

Braya purpurascens (R. Br.) Bunge in Ledeb. Fl. Ross. **1**: 195. 1841.

Platypetalum purpurascens R. Br. in Parry's 1st Voy. App. 267. 1823.

Platypetalum dubium R. Br. ibid.

Braya Thorild-Wulffii Ostenf. in Medd. om Grønl. **64**: 176. 1923.

? *Braya americana* (Hook.) Fern. in Rhodora **28**: 203. 1926.

? *Braya Longii* Fern. ibid., 202. 1926.

Braya purpurascens is a variable species which apparently is circumpolar. Where growing together with *B. pilosa* and *B. glabella,* it flowers at least three weeks later. The scapes are shorter and ascending, in fruit seldom more than 10 cm. high; the fruiting raceme is capitate or at least not much elongated. The mature siliques are plump, rarely 10 mm. long, and from 1.2 to 2 mm. thick. The style is short and thick, about 0.5 mm. long. The seeds apparently are sticky when wet but are not conspicuously mucilaginous.

In North America *B. purpurascens* is distributed from the shores of Bering Sea along the Arctic Coast to eastern Greenland, north to the end of land and south to lat. 60° in Labrador (? Newfoundland) and to high mountains of Alberta. Apparently it is a decided calciphile.

DROSERACEAE

Drosera anglica Huds.

GREAT BEAR LAKE: McTavish Arm, north shore, in a marl bog, *5237.*

New to the flora of the Northwest Territories.

SAXIFRAGACEAE

Saxifraga bronchialis L. ssp. **Funstonii** (Small) Hultén.

RICHARDSON MTS.: West of Mackenzie Delta, *6684, 6829, 6830.*

New to the flora of the Northwest Territories.

Saxifraga ferruginea Grah.

MACKENZIE RIVER DELTA: Peel River, 1888, *McConnel 8417* (Can), distributed as *S. stellaris* L.

New to the flora of the Northwest Territories.

Saxifraga flagellaris Willd.

RICHARDSON MTS.: West of Mackenzie Delta, *6683, 6828.*

New to the flora of the Mackenzie District.

Saxifraga foliolosa R. Br.

ARCTIC COAST: Atkinson Pt., *2629.*

New to the flora of the Mackenzie District.

Saxifraga nivalis L.

GREAT BEAR LAKE: Dease Arm, *4842;* McTavish Arm, *3783, 5204, 5307.*

The above numbers represent a new western limit in the Northwest Territories, since previous records should be referred to *S. reflexa* Hook.

Saxifraga reflexa Hook.

The writer, in Rhodora **41**: 242. 1939, has pointed out that the plant which in Alaska has passed for *S. nivalis* really belongs here (see notes on that species). In the Mackenzie Delta and on the Arctic Coast, *S. reflexa* is common east to Cape Dalhousie but apparently is not found far inland.

Parnassia parviflora DC.

GREAT BEAR LAKE: McTavish Arm, east shore, *3749.*

New to the flora of the Northwest Territories and not previously collected in the Mackenzie basin outside the Rocky Mountains.

Ribes hudsonianum Richards.

MACKENZIE RIVER DELTA: Aklavik, *7309.*

Common at Great Bear Lake and in rich woods north to some distance south of the tree limit.

Ribes lacustre (Pers.) Poir.

MACKENZIE DISTR.: Yellowknife R., Gordon Lake, *J. Carroll 67A* (Can).

Ribes lacustre of Hook. Fl. Bor.-Am. **1**: 232. 1834, "To Fort Franklin and Bear Lake, near the Arctic Circle," is *R. oxyacanthoides* L., and the above is the first record of true *R. lacustre* from the Northwest Territories.

ROSACEAE

Spiraea Beauverdiana Schneid. See Rhodora **41**: 244. 1939.

This western species is very common in the higher parts of the Mackenzie Delta in heath and open birch woods, and near the East Branch it reaches the Arctic Coast. It extends but a short distance eastward, to the Eskimo Lake Basin, 2nd lake, *2991*.

Luetkea pectinata (Pursh) Kuntze.

In the National Herbarium of Canada is a specimen labelled: N. W. T., Peel R., Mackenzie, 1889, *McConnel 5722*. McConnel crossed from the Mackenzie Delta into Yukon and Alaska via the Rat-Porcupine R. Pass, and this alpine species was no doubt collected in the mountains west of the Delta.

Amelanchier sanguinea (Pursh) DC.

GREAT BEAR LAKE: Bear River, lower slopes of Mt. Charles, *3298*.

Following Wiegand, in Rhodora **14**: 138. 1912, the above specimens are best placed here. This is the "saskatoon berry" of the Mackenzie, common at least to the Good Hope Ramparts.

Rubus pubescens Raf.

MACKENZIE RIVER DELTA: East Branch, *6550*.

Previously known in the Mackenzie basin north to Simpson.

Potentilla ? pectinata Raf.

ARCTIC COAST: Atkinson Pt., *2635*.

This plant has 3- to 5-parted basal leaves, almost circular in outline, with much broader lobes than in typical *P. pectinata*. The leaves are thinly tomentose-pruinose beneath but not silky-villose. It may be *P. glabrella* Rydb., a species not too well-marked from *P. pectinata*, but differs from it by the almost orbicular leaves and the large flowers, which have broad, deeply notched petals.

Potentilla pensylvanica L.

RICHARDSON MTS.: West of Mackenzie Delta, *6603, 6638, 6834;* ESKIMO LAKE BASIN: *3036*.

Previously known northward to Great Bear Lake.

Potentilla pulchella R. Br. var. **gracilicaulis** var. nov.

Caules floriferi 5–30 cm. alti, 3–8-flori, e basi ascendente erecti, folia 1 vel raro 2 in parte inferiore ferentes, tenuissimi, rubiginosi, sericeo-villosi mox glabrescentes; folia basalia longipetiolata, sub-bijugata, foliola terminalia longe petiolata, superne glabrata, subtus sparse sericeo-villosa; stipulae castaneae, glabrae. Flores parvi sunt, illosque speciei in mentem vocant.

ARCTIC COAST: Atkinson Pt., 70° N., 131° 20′ W., top of sandy cutbank, Aug. 1–3, 1927, *A. E. & R. T. Porsild 3632* (TYPE); same place, *2633;* Tuktuayaktoq, *7425;* Cape Dalhousie, *2776–2778;* Cape Bathurst, *Can. Arct. Exp. 511;* YUKON TERRITORY: Herschel Isl., *Can. Arct. Exp. 241, 241A*.

Our plant is a characteristic species in sandy places along the arctic coast east of the Mackenzie. It is abundantly distinct from the typical form except in the floral parts. It may be *P. pulchella β elatior* Lange, Consp. Fl. Groenl. 4. 1880, which is *P. subarctica* Rydb., in N. Am. Flora **22**: 347. 1908, but if so it is very different from a plant from Hudson Bay which Rydberg, in the National Herbarium of Canada, has named *P. subarctica*. Polunin, l. c., has taken up var. *elatior* Lange for this, suggesting that it is a "luxuriant southern form." Of *β elatior* Lange, Th. Wolf (in Bibl. Bot. **16**[Heft 71]: 152. 1908) merely says: ". . . die ich mit Abromeit (Bibl. bot. Heft 42. 7.) nur als 'Standortsformen, die in einander übergehen,' auffasse. . . ."

Potentilla pulchella var. *gracilicaulis* is, perhaps, less "arctic" than the species. In the large series collected at Cape Dalhousie (*2766–2768*) some specimens are only a few centimeters high, but none of them are transitional to the species. On Aug. 7–14, 1927, the plant was still in anthesis; it probably does not mature fruits there except in favorable seasons.

Typical *P. pulchella* apparently is an eastern species which is rare or restricted to high latitudes west of Hudson Bay, and the plant which Hooker, l. c., reports from "Shores of the mainland between the Coppermine and Mackenzie Rivers. *Dr. Richardson*" is undoubtedly our plant.

Potentilla rubricaulis Lehm. Nov. Stirp. Pug. **2**: 11. 1830, et Rev. Pot. 68, *tab. 30*. 1856.

Arctic Coast: Cape Dalhousie, 70° 20′ N., 129° 55′ W., dry sandy plain, Aug. 7–14, 1927, *2774, 2774A;* Liverpool Bay, *2905*.

This is one of the rarest of the arctic *Potentillae* and one which, as pointed out by Simmons (Fl. Ellesmere Land, 50–54. 1906), has been generally misunderstood by Rydberg and others. Because the type came from Bear Lake ("About Bear Lake, in lat. 66°. *Dr. Richardson*"), the writer was particularly anxious to obtain authentic material. In this he failed in the Bear Lake Region, but on the Arctic Coast, at Cape Dalhousie, he obtained a large series of specimens that perfectly match Lehmann's description and beautiful plate.

Our specimens had immature fruits in the middle of August and also fully expanded flowers on the same plants. The flowers are almost 2 cm. in diameter, somewhat larger than in the type (Th. Wolf, l. c., 170). Lehmann and Wolf have both remarked that *P. rubricaulis* bears some resemblance to 5-nate forms of *P. nivea,* but Wolf, l. c., correctly states that it may at once be distinguished from *P. nivea* and forms by its conical style; it should be noted, however, that in the Mackenzie District the base of the style, in all forms of *P. nivea* examined by the writer, is enlarged and papillose, although the style itself is slender and filiform as described by Wolf.

The tomentum of the undersides of the leaves, in our plant as well as in all other material of *P. rubricaulis* seen by the writer, is thinner than in most forms of *P. nivea,* so that the main nerves are distinctly visible. Also characteristic of *P. rubricaulis* is the fact that the tomentum extends in a small, white tuft, from each tooth or lobe of the leaflets.

Distribution: *Potentilla rubricaulis* extends from Great Bear Lake and the Arctic Coast across the Arctic Archipelago east to N. W. Greenland and to the Franz Joseph Fiord region of the east coast.

Sibbaldia procumbens L.

Richardson Mts.: West of Mackenzie Delta, common locally in herb mats, 1500′ elev., *6833;* Great Bear Lake: Etacho Pt., 1500′ elev., *3502;* Keewatin Distr.: Kazan R., *5827, 6045;* Lake on Tha-anne R., *5589*.

The North American distribution of *Sibbaldia* is rather peculiar and very disrupted. It is common in E. & W. Greenland, north to 73° and 72°, rare on the Labrador coast, isolated in mountains of Newfoundland, Gaspé, and New Hampshire, fairly common in the Hudson Bay region south to James Bay, north to southern Baffin Island, and west to Central Keewatin. It is common in the high mountains of Alberta and British Columbia, Montana, Idaho, Wyoming, Colorado, and Utah, south to California, with two isolated, alpine stations in the Mackenzie District and one in Central Alaska. It is also common on islands of the Bering Sea. The species was previousy unrecorded from the Mackenzie District.

Geum glaciale Adams.

RICHARDSON MTS.: West of Mackenzie Delta, between 2000 and 4000′ elev., *6602, 6694.*

In Canada otherwise known only from Yukon Territory. New to the flora of the District of Mackenzie.

Dryas octopetala L.

MACKENZIE RIVER DELTA: E. Branch, *7032;* Campbell Lake, *1999;* Richards Isl., *2098.*

A western species common in the mountains of Alaska and Yukon east to the Mackenzie Delta. East of the Delta it has been collected but a few times.

LEGUMINOSAE

Astragalus Collieri (Rydb.) comb. nov.

Atelophragma Collieri Rydb. in Bull. Torr. Bot. Cl. **55:** 127. 1928.

GREAT BEAR LAKE: East shore of McTavish Arm, open spruce woods on sandy soil, *3751.*

Our specimens are with mature fruits; they match the description as well as the type, which came from Eagle, Alaska, June 29, 1902, *A. C. Collier, 50* (US *no. 379736*), and also: Near Post on Forty Mile Creek, Yukon Valley, June 9, 1893, *F. Funston 67,* teste Rydb. (G), except that the pods in ours (collected late in the season) are merely puberulent.

Astragalus Collieri superficially resembles *A. frigidus* var. *americanus* (Hook.) S. Wats., from which it may at once be distinguished by its dark purplish stems and peduncles, which are covered with a minute white pubescence, and by its purplish brown pods. These are 2 cm. long, turgid, with a very narrow stipe 0.5 to 0.6 cm. long, and contain from 5 to 8 seeds. The seeds are dark olive green, dull, orbicular, about 2 mm. in diameter.

The known distribution is: Eastern central Alaska, south to Glacier Bay, east to Great Bear Lake. New to the flora of Canada.

Astragalus linearis (Rydb.) A. E. Porsild. See Rhodora **41:** 250. 1939.

RICHARDSON MTS.: West of Mackenzie Delta, windswept gravelly ridges, 3000′ elev., July 7–10, 1933, *6697* (flowering specimens); COPPERMINE RIVER: Fort Hearne to Bloody Falls, 1931, *A. M. Berry 14* (fruiting specimens); YUKON TERRITORY: Dry Gulch, *Gorman 1014;* White Horse, *Eastwood 625* [both in Can. Nat. Herb., teste Rydberg].

The above numbers appear to be the first collections from the Northwest Territories, since a fragment in the National Herbarium of Canada from Great Bear Lake, collected by *J. M. Bell* (*22899*, Can) and named *Atelophragma lineare* by Rydberg, is really *Astragalus eucosmus* Robins. Although Rydberg, in N. Am. Flora **24:** 368. 1929, recorded *A. lineare* only from "Mackenzie and Yukon Territories," there is in the National Herbarium of Canada a typical specimen from Manitoba: Mouth of Qu'Appelle River, June 28, 1906, *John Macoun & William Herriot 70479,* labelled by Rydberg himself *Atelophragma lineare.* The

known distribution of *Astragalus linearis* is: Alaska, Yukon, Northwest Territories east to Coppermine River and south to Manitoba.

Astragalus yukonis M. E. Jones, Rev. Astr. 83, *tab. 7, fig. 28.* 1923.

Mackenzie River Delta: South end of Richards Isl., on sandy riverbanks, where it formed large clumps, *2105.*

New to the flora of the Northwest Territories.

Oxytropis arctica R. Br. in Suppl. App. Parry's 1st Voy. 278. 1824; Hook. Fl. Bor.-Am. **1:** 146. 1834 (var. *subumbellata* and var. *microphylla*); Gray in Proc. Am. Acad. **20:** 4. 1884, in part; Simmons, Phytogeogr. Arct. Am. Arch. 112. 1913; Fern. in Rhodora **30:** 144, *tab. 172* (upper). 1928.

Oxytropis Roaldi sensu Macoun & Holm in Rept. Can. Arct. Exp. **5A:** 17, *tab. 8, fig. 2.* 1921, ? non Ostenfeld.

Oxytropis coronaminis Fern. in Rhodora **30:** 151, *tab. 175.* 1928.

Of the numerous critical species of plants in the flora of boreal and arctic North America, most of the members of the genus *Oxytropis,* as shown by Fernald's revision in Rhodora **30:** 137–155. 1928, have been much misunderstood by earlier writers. Hooker, l. c., clearly did not understand the genus, nor did John Macoun in his Catalogue of Canadian Plants, nor in more recent times J. M. Macoun and Theodore Holm. In addition to taxonomic difficulties, the genus offers a number of geographical puzzles, as pointed out by Simmons, l. c., 111.

In the course of many seasons' collecting in many parts of the Canadian Arctic, from the Alaska boundary to Hudson Bay, the writer paid special attention to this genus. Of its purple-flowered members, two of the most elusive and puzzling species appear to be *O. Roaldi* Ostenf. and *O. arctica* R. Br. In six seasons' collecting in the Mackenzie District the writer never succeeded in finding the former, which thus far is known only from the type locality (Herschel Island). Of the latter Fernald, l. c., in addition to the type (Melville Island), recognized but one collection (between Coppermine River and Cape Alexander, *Rae*); Ostenfeld, l. c., did not find it in the Gjöa Expedition collections. Several collections made by members of the Canadian Arctic Expedition, 1915–1918, and recorded by Macoun & Holm, l. c., as *O. Roaldi,* Fernald was unable to identify with either that species or with *O. arctica.* He therefore described the Can. Arct. Exp. plant as *O. coronaminis,* to be distinguished from *O. arctica* "by its much larger flowers, longer calyx-tube and -teeth and very large corolla with vexillum fully twice as broad as in true *O. arctica.*" But in several numbers cited by Fernald in the National Herbarium of Canada, the size of the flower and the length of the corolla, calyx-tube and -teeth vary greatly. In McMillan's collection from Melville Island (*77294,* Can), the corolla is 1.5 cm. long and the teeth of the calyx ¼ as long as the tube. In a specimen from near the type locality of *O. coronaminis* (*A. E. & R. T. Porsild 4745*), the flowers are even smaller and the calyx-teeth vary in length from ¼ to ⅓ of the length of the calyx-tube. Likewise in the stipules, often of systematic value in this genus, there does not appear to be any difference between *O. coronaminis* and *O. arctica.* To the description given by Fernald, l. c., for *O. coronaminis,* it may be added that the veins of the free blades of the stipules are green and very conspicuous; the main vein has a number of upward pointed side branches and ends in the green tip of the blade; the edges, besides the long, white ciliae, are beset with large, sessile glands or papillae.

Thus if *O. coronaminis* is conspecific with *O. arctica,* the distribution of the latter becomes more natural, making it an endemic of the central and western Arctic Archipelago and the mainland from Anderson River east to Bathurst Inlet, possibly with an isolated station in mountains of east central Alaska (Steese Highway, Eagle Summit, 3880′ elev., *E. Scamman 806;* Richardson Highway, Miller House, 4810′ elev., *idem 807;* both in Gray Herb.). The following specimens are in the writer's collection from the Mackenzie District:

Arctic Coast: Cape Dalhousie, old dunes and dry tundra, *2780,* dry sandy slope, *2779B;* Great Bear Lake: North shore of Dease Arm, near headwaters of Horton R., *4745.*

Oxytropis Belli (Britt.) Palibine. See Fernald in Rhodora **30**: 150. 1928.

To the description and discussion by Fernald, l. c., it may be added that *O. Belli* forms large cushions a foot or more in diameter. The central root in old specimens sends out numerous freely forking branches, but these do not produce adventitious roots. In life the calyx is dark red with almost black teeth; the corolla is pinkish violet with a pale spot on the front of the vexillum and 4 or 5 bluish lines on each side; the scapes are reddish brown. On the west coast of Hudson Bay, *O. Belli* flowers before all other species of *Oxytropis.* The flowers are faintly fragrant.

Oxytropis campestris (L.) DC. (sensu str.); Hook. Fl. Bor.-Am. **1**: 147. 1834, var. *melanocephala* (in part only).

Oxytropis glabrata Rydb. Fl. Prairies and Plains 485. 1932, non *O. glabrata* (Hook.) Nels. in Univ. Wyom. Publ. Bot. **1**: 117. 1926.

Acaulescent with a strong tap-root ending in a multicipital crown; stipules membranaceous, translucent, white, sparingy villous to glabrate, the free blades long-ciliate and with a few large papillae, subulate, prominently nerved; leaves 10–15 cm. long, leaflets opposite, lanceolate, acuminate, sparingly adpressed-sericeous, soon glabrate, with involute margins, dark green; scapes 15–20 cm. high, brownish green, sparingy silky villous, soon glabrate, erect or ascending; spike subcapitate, slightly elongated in fruit, 10–15-flowered, the bracts linear, ¾ as long as the calyx; calyx dark green with rather short grayish black hairs; calyx-lobes black-hirsute, subulate, ¼ as long as the tube; corolla about 1 cm. long, in life pale yellow or dirty white, somewhat darker when dry; legumes grayish green, long-beaked, incompletely 2-celled, sparingly covered with short black hairs; seeds oblique-heartshaped, 1.5–2 mm. in diameter, greenish gray.

In open, sandy, or gravelly places from northern Labrador west to Yukon, not north of the tree-line.

Hudson Bay: Churchill, 58° 47′ N., 94° 14′ W., gravelly plain, July 3, 1930, *5480;* same place, *J. M. Macoun 79102* (Can); same place, *G. Gardner 68* (Can); same place, *N. Polunin 1949* (Can), distr. as *O. monticola* Gray; Labrador: Komaktorvik Fj., 59° 17′ N., 63° 45′ W., *V. C. Wynne-Edwards 7120* (Can); Mackenzie River: Fort Good Hope, *Miss E. Taylor 5353* (Can), as *O. Lamberti* Pursh; Yukon: Carmacks, *A. Eastwood 572* (Can).

The above numbers are such a close match for *O. campestris* of northern Europe that, although a number of related American species from time to time have been recorded under this name, there does not appear any good reason why the latter, in a strict sense, should not be applied to this plant. *Oxytropis campestris,* like *O. Maydelliana,* thus becomes almost circumpolar. Our plant is closely related to *O. gracilis* (A. Nels.) Schum., from which, however, it may at once be distinguished by the dark pubescence of the calyx and legumes. From the only other white-stipuled, pale-flowered northern species, *O. hyperborea,* it is easily distinguished by the absence of verticillate leaflets, the very characteristic subulate free parts of the stipules, and by the less dense vestment of hairs.

When Rydberg examined most of the material in the National Herbarium of Canada, he annotated several sheets of *O. campestris* as "*O. glabrata* (Hook.) A. Nels." There can be little doubt that while Rydberg well understood the species, he misapplied Nelson's interpretations of *O. glabrata.* When that author made his transfer he obviously had in mind Hooker's *Oxytropis campestris* var. *glabrata* (foliolis glabriusculis subsucculentis), but what Hooker meant by this is not at all clear; it might have been the glabrate form of *O. Maydelliana,* although the "subsucculent leaflets" strongly suggests *O. hudsonica.* There can be no doubt, however, as to which plant Nelson actually thought of, because in his discussion, l. c., he adds: "Besides the characters given by Hooker, the following drawn from the sheet cited below (*M. W. Gorman, 1365,* Nogheling R., Alaska, July 21, 1902) may be added: Sparsely strigose hairy on leaves and scapes; the leaflets often nearly or even quite glabrous above; the branches of the caudex dark-brown from the numerous dead glabrous petioles." This clearly shows that Nelson's *O. glabrata* is *O. Maydelliana* Trautv. Rydberg, l. c., does not mention the colour of the stipules, but from his annotations on sheets of the pale-stipuled *O. campestris* it is obvious that by *O. glabrata* (Hook.) Nelson he did not mean *O. Maydelliana* Trautv., which, in the Ottawa collection, he annotated *O. melanocephala* (Hook.) Rydb.

General distribution: Arctic and subarctic alpine Europe; Siberia; subarctic North America (? not in Alaska); not in Iceland.

Oxytropis hudsonica (Greene) Fern. in Rhodora **30**: 142. 1928.

Richardson Mts.: West of Mackenzie Delta, 1500–2000′ elev., *6608, 6700, 6838;* Arctic Coast: Liverpool Bay, *2908;* Great Bear Lake: Ft. Franklin. Common in Keewatin District.

In life the scapes of *O. hudsonica* are erect, ascending or sometimes decumbent, and conspicuously angled. The entire plant is fresh green and very viscid to the touch; the leaflets are somewhat fleshy and, due to the strongly involute margins, somewhat boat-shaped, obscurely keeled. The flowers are reddish purple, becoming almost blue in fading, and very fragrant with a perfume reminiscent of roses. The mature seeds are coal-black, reniform, smooth, dull, 1.6–1.8 × 1.2–1.4 mm.

Oxytropis hyperborea sp. nov.

Oxytropis campestris var. *melanocephala* Hook. Fl. Bor.-Am. **1**: 147. 1834, in part.

Oxytropis campestris (L.) DC. var. *sordida* Willd. sensu Holm & Macoun in Rept. Can. Arct. Exp. **5A**: 16. 1924, in part.

Oxytropis ? borealis sensu Fern. in Rhodora **30**: 143. 1928, non DC. Prodr. **2**: 275. 1825.

Herba acaulescens radice crassa descendente; folia 3–12 cm. longa, stipulae membranaceae vel chartaceae pallidae vel albescentes, longe sericeo-villosae, persistentes, laminae parte libera longe ciliata, longe attenuata et haud subulata, prominenter nervosa; foliola lineari-lanceolata, 1 cm. longa, 0.3–0.4 cm. lata, subverticillata, 3- vel 4-juga, matura ob rhachem elongatum habitu interdum alternata vel opposita, utrinque cum rhachi sericeo-villosa, supra in speciminibus e locis udis interdum glabrata, tenella margine subrevoluta, adulta revoluta vel fere revoluta; scapi 5–20 cm. alti, longe sericeo-villosi, vulgo erecti sed in speciminibus e regionibus borealibus ultimis plus minusve prostrati; spica subcapitata, sublaxiflora, elongans, 6–10-flora, floribus infimis saepius sat discretis; bracteae lineares calycem aequantes; calyx albus, sericeo-villosus, indumento pilis nigris abbreviatis commixto, quapropter, pubescentia albicante aetate labefacta, calyx obscuriore colore evadens; calycis lobi triangulares, apice subulati quam tubo ⅔ breviores; corolla circa 1.5 cm. longa, in speciminibus vivis ochroleuca

vel sordide albida, exsiccans in vexillo interdum puncto nigricante (in plantis vivis nullo vel vix obvio) maculata; legumina 1–1.5 cm. longa, subinflata, longirostrata, imperfecte bilocularia, indumento denso sericeo-villoso, pilis nigris paucis brevibus intermixto demum evanido.

In sandy and gravelly places or in dry tundra, from mountains of eastern Alaska and Yukon east along the Arctic Coast to Coronation Gulf, south to Great Bear Lake.

Mackenzie River Delta: East Branch, lat. 68° 55′ N., dry sandy slopes, July 21, 1934, *A. E. Porsild 7033* (type). In addition to the type the following specimens, all in the National Herbarium of Canada, may be considered typical: Alaska: Near Head of Chitina R., dry hillsides, 2500′ alt., *H. M. Laing 134, 135;* Arctic Coast of Yukon Territory: 69° 12′ N., 138° to 138° 30′ W., *7151;* Mackenzie River Delta: South end of Richards Isl., dry slopes, *7072;* same vicinity, *2106;* north end of Richards Isl., *2253;* same vicinity, *7449;* Arctic Coast: 6 miles east of Kittigazuit, sand dunes, *2502;* Cape Dalhousie, old dunes and dry tundra, *2779;* Great Bear Lake: North shore of Dease Arm, dry tundra and sand dunes, *4705;* Cape McDonnel, low tundra and lake shore, *5155;* Etacho Pt., elev. 1500′, alpine tundra, *3503;* Leith Pt., open woods and sandy beaches, *3583;* McTavish Arm, Hunter Bay, shady ravines near cold spring, *5328;* Dolphin & Union Strait: Bernard Harbour, *Can. Arct. Exp. 332* (in part); Clifton Pt., *Can. Arct. Exp. 690, 691;* Victoria Isl., *Can. Arct. Exp. 386.*

Oxytropis hyperborea is well-marked from the other yellow-flowered northern species by its verticillate leaflets, and from *O. Maydelliana* also by its pale stipules (for contrast with *O. campestris* see treatment of this species). It belongs in the group of arctic plants which Hooker and most later authors have cited under *O. campestris, O. campestris* vars. *glabrata, sordida* and *melanocephala, O. leucantha,* and *O. monticola.* Fernald, l. c., 142–144, when he wrote about this group and showed that the castaneous- or fulvous-stipuled plant is really *O. Maydelliana,* perhaps was the first to point to the existence of still another clear-cut species which he tentatively identified with *O. borealis* DC., from extreme E. Siberia. Because de Candolle listed *O. borealis* under the heading "*floribus purpurascentibus aut albis" rather than under "**floribus ochroleucis," and in view of the following passages in his description: "foliolis . . . subtus glabris . . . scapis folii longitudine, floribus capitatis, bracteis calycis nigro-hispidissimi longitudine," it seems scarcely possible to identify our Canadian arctic plant with *O. borealis* DC. This view is strengthened by the fact that *O. hyperborea* does not seem to occur in N. W. Alaska, nor has the writer seen any other pale-stipuled, yellow-flowered *Oxytropis* from northern Alaska. The fact that Hooker (Fl. Bor.-Am. **1**: 145) cited specimens of *O. borealis* collected by Lay and Collie (Kotzebue Sd.) is no proof of its presence in Alaska. These specimens may well have been *O. Maydelliana,* because Hooker obviously did not understand the northern members of this genus well. It may be significant also that Hooker, l. c., when copying (otherwise verbatim) de Candolle's description, left out the last epithet: "Stipulae pallidae."

For his treatment of *Oxytropis* for "North American Flora," Rydberg examined all arctic material in the National Herbarium of Canada. The low, northern form of *O. hyperborea* as exemplified by *Can. Arct. Exp. 332* from Bernard Harbour, Aug. 15, *F. Johansen,* and *nos. 690* and *691* from Clifton Point, is annotated by Rydberg as "*Oxytropis Johansenii* Rydb." Unfortunately sheet no. *332,* marked "type" by Rydberg, contains three plants, two of which are *O. hyperborea,* while the third is typical *O. Maydelliana.* The isotype of "*O. Johansenii,*" in N. Y. Bot. Gard., is all *O. hyperborea.* Rydberg's "*O. Johansenii*" (not to be confused with *O. Johannensis* Fern.) was never published. *Oxytropis monticola* Gray and *O. alpicola* Rydb. both have pale stipules. The

first has purple flowers and the latter is said to have decumbent peduncles and an ochroleucous corolla with a purple spot on the keel.

Oxytropis pygmaea (Pall.) Fern.

RICHARDSON MTS.: West of Mackenzie Delta, 2000–3500′ elev., *6699, 6841;* MACKENZIE RIVER DELTA: East Branch, *7037.*

New to the flora of the Northwest Territories.

Oxytropis retrorsa Fern.

ESKIMO LAKE BASIN: 1st lake, *6936;* GREAT BEAR LAKE: Bear River, *3365.*

New to the flora of the Northwest Territories.

Lathyrus ? palustris L.

A *Lathyrus,* probably of this species, was observed in winter along the dog trail above Arctic Red River on the lower Mackenzie.

CALLITRICHACEAE

Callitriche autumnalis L.

MACKENZIE RIVER DELTA: East Branch, *6920, 7237;* ESKIMO LAKE BASIN: *2995, 3063, 6934;* GREAT BEAR LAKE: Bear River, *3366;* Keith Arm, *3438;* McTavish Arm, *3697.*

Perhaps common or at least occasional north to the limit of trees.

Callitriche verna L. emend. Lönnroth.

ESKIMO LAKE BASIN: Setidgi Lake, *3180;* GREAT BEAR LAKE: McTavish Arm, *3713, 3697;* Keith Arm, *5279;* KEEWATIN DISTR.: Lake on Tha-anne R., *6179;* Lower Kazan R., *6058, 6059.*

Probably common throughout the Northwest Territories north to the limit of trees or slightly beyond.

VIOLACEAE

Viola labradorica Schrank.

GREAT BEAR LAKE: South shore, Leith Pt., *3546;* McTavish Arm, *3584.*

New to the flora of the Mackenzie District.

Viola Langsdorffii Fisch.

RICHARDSON MTS.: West of Mackenzie Delta, *7342.*

New to the flora of the Northwest Territories.

Viola pallens (Banks) Brainerd.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3504;* KEEWATIN DISTR.: Kazan R., *5831, 5832, 6056;* Lake on Tha-anne R., *5591.*

New to the flora of the Northwest Territories.

Viola renifolia Gray var. **Brainerdii** (Greene) Fern.

GREAT BEAR LAKE: McTavish Arm, *5312.*

ELAEAGNACEAE

Shepherdia canadensis (L.) Nutt.

MACKENZIE RIVER DELTA: Campbell Lake, *1952, 2004;* Richards Isl., *2111;* ESKIMO LAKE BASIN: *3043, 3160;* GREAT BEAR LAKE: Ft. Franklin, *3220;* Dease Arm, *4776, 4814.*

Common or occasional on calcareous soil north to the Mackenzie Delta but not observed east of the Palaeozoic formation. At its northern limit all the plants appeared to be male.

ONAGRACEAE

Epilobium arcticum Samuelss.

RICHARDSON MTS.: West of Mackenzie Delta, *6704, 6842.*

Previously known in Canada only from the Eastern Arctic.

Epilobium davuricum Fisch.

Arctic Coast of Yukon Territory: King Pt., *7187;* Mackenzie River Delta: Campbell Lake, *1939;* Kittigazuit Isl., *2376, 2506;* Great Bear Lake: Keith Arm, Deerpass Bay, *3445;* Dease Arm, *4846;* Keewatin Distr.: Kazan R., *5833, 6054.*

New to the flora of the Mackenzie District.

Epilobium palustre L.

Common northward beyond the limit of trees, and represented by many numbers in the writer's collections from the Mackenzie Delta, the Arctic Coast, Great Bear Lake, and Central Keewatin. Previously recorded in the Mackenzie basin north to 64° (*Richardson*).

HIPPURIDACEAE

Hippuris tetraphylla L. f. See Rhodora **41**: 264. 1939.

Arctic Coast of Yukon Territory: Shingle Pt., *6907.*

New to the flora of Canada.

HALORRHAGACEAE

Myriophyllum alterniflorum DC.

Eskimo Lake Basin: North shore of 2nd lake, *2997;* Great Bear Lake: Etacho Pt., 1500′ elev., *3506;* Dease Arm, *4706.*

Our specimens are all sterile. New to the flora of the Northwest Territories.

Myriophyllum exalbescens Fern.

Mackenzie River Delta: Aklavik, *7308;* Campbell Lake, *2026;* East Branch, *6921, 7239, 7249;* Eskimo Lake Basin: 2nd lake, *2998;* Setidgi Lake, *3111.*

Myriophyllum exalbescens, as elsewhere, appears to be more northern than *M. alterniflorum,* and in the Mackenzie Delta it may normally produce mature fruit.

UMBELLIFERAE

Bupleurum americanum Coult. & Rose.

Richardson Mts.: West of Mackenzie Delta, to 4000′ elev., *6705, 6844;* Mackenzie River Delta: East Branch, *7041;* Campbell Lake, *1942;* Richards Isl., *2108.*

A western species which has merely crossed the Mackenzie, not previously recorded from the Northwest Territories.

Cicuta mackenzieana Raup in Jour. Arn. Arb. **17**: 279, *pl. 197.* 1936.

Eskimo Lake Basin: Setidgi Lake, *3177.*

Not previously known in the district north of Great Slave Lake (*Raup*).

Conioselinum cnidiifolium (Turcz.) A. E. Porsild. See Rhodora **41**: 267. 1939.

This plant belongs in that group of western species that reach their eastern limit near the Mackenzie Delta, but, unlike most of these, it has penetrated a few hundred miles along the Arctic Coast to the mouth of the Anderson River (Liverpool Bay, *2914*). It is very common on sandy river banks in the Delta and is probably the plant which Richardson (Arctic Searching Exp. **1**: 233. 1851) reports under "Musenion divaricatum, East Branch, in lat. 68° 25′ on sandy banks."

CORNACEAE

Cornus canadensis L.

Great Bear Lake: Bear River, Mt. Charles, *3317, 3350, 3351.*

Hooker's statement, l. c., "Throughout Canada, nearly to the Arctic Coast, everywhere as far as the Pine woods extend.—*Richardson,*" certainly needs veri-

fication, especially as "Pine woods" here probably is intended to mean "coniferous woods." In the writer's experience, *C. canadensis* does not extend beyond the Canadian zone, and in the Mackenzie District it is limited to the Mackenzie Valley and Great Slave Lake.

Cornus stolonifera Michx.

GREAT BEAR LAKE: Bear River, Mt. Charles, forming thickets by a small stream, *3339*.

Unrecorded from the Northwest Territories, although specimens from Simpson and Norman, collected by Miss E. Taylor, are in the National Herbarium of Canada. Hooker's report, under *C. alba* L., "north to lat. 69°—*Richardson,*" is certainly erroneous and is probably a misprint for "59°." Richardson, in Franklin's Journ. App. 732, says "W" (wooded country between lat. 54 and 64).

PYROLACEAE

Pyrola chlorantha Sw.

MACKENZIE RIVER: Sans Sault Rapids, *6570;* Bear Rock, Ft. Norman, *3389;* GREAT BEAR LAKE: Bear R., *3286;* Mt. Charles, *3335;* McTavish Arm, north shore, *5314;* Leith Pt., *3549*.

Rare or occasional in cold spruce woods, north in the Mackenzie basin to Ft. Norman and Bear Lake.

Pyrola minor L., Hook. Fl. Bor.-Am. **2:** 45. 1834; Simmons, Phytogeogr. Arct. Am. Arch. 115. 1913.

RICHARDSON MTS.: West of Mackenzie Delta, *7343;* MACKENZIE RIVER DELTA: East Branch, *6552;* GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3508;* Leith Pt., *3585, 3586*.

A rare species of peculiar and disrupted range. Hooker's statement, l. c., "Barren country from lat. 64° to the Arctic Coast and Islands," certainly is erroneous. Very questionable also is the record from Melville Peninsula, Simmons, l. c. The above are the first authentic collections in the Northwest Territories.

Pyrola secunda L.

MACKENZIE RIVER: Sans Sault Rapids, *6569*.

Pyrola secunda L. var. **obtusata** Turcz. See Porsild in Rhodora **41:** 274. 1939.

RICHARDSON MTS.: West of Mackenzie Delta, *6611;* MACKENZIE RIVER DELTA: East Branch, *6966;* Campbell Lake, *1943, 1944;* Richards Isl., *2262;* Kittigazuit Isl., *2381;* ARCTIC COAST: 6 mi. east of Kittigazuit, *2507;* Atkinson Pt., *2643;* Liverpool Bay, *2915;* ESKIMO LAKE BASIN: *3000, 3044;* GREAT BEAR LAKE: Ft. Franklin, *3223;* Bear R., *3319;* Cape McDonnel, *3156;* Dease Arm, Narakay Isl., *4848;* McTavish Arm, north shore, *5315;* south shore, *3633;* KEEWATIN DISTR.: Yathkyed Lake on Kazan R., *5838;* Lower Kazan R., *6060;* west coast of Hudson Bay, *5704*.

A species characteristic of northern coniferous woods but which, in the continental Northwest Territories, reaches far north of the limit of trees.

ERICACEAE

Loiseleuria procumbens (L.) Desv.

RICHARDSON MTS.: West of Mackenzie Delta, June 20, 1931, *O. Bryant;* GREAT BEAR LAKE: Dease Arm, north shore, *4707;* KEEWATIN DISTR.: Baker Lake, *6102;* Lake on Tha-anne R., *5594*.

A rare species in the Mackenzie District, limited to acid pre-Cambrian rocks.

Kalmia polifolia Wang.

GREAT BEAR LAKE: Keith Arm, *3429;* Etacho Pt., 1500′ elev., *3509;* KEEWATIN DISTR.: Lake on Tha-anne R., *5595*.

A plant of northern muskegs that in Keewatin extends some distance beyond the limit of trees; rare in the lower Mackenzie Basin, north to Bear Lake and in Central Yukon.

Phyllodoce coerulea (L.) Bab.

KEEWATIN DISTR.: Thelon R., *J. B. Tyrrell 15563, 23194* (Can); Thelon Sanctuary, *C. H. D. Clarke 808.*

An eastern species which reaches west to Central Keewatin.

Cassiope hypnoides (L.) D. Don.

KEEWATIN DISTR.: Thelon Sanctuary, *C. H. D. Clarke 804;* Maguse R., *W. Güssow 57.*

Like the preceding, an eastern species which reaches but a short distance west of Hudson Bay.

Chamaedaphne calyculata (L.) Moench.

RICHARDSON MTS.: West of Mackenzie Delta, *6614;* MACKENZIE RIVER DELTA: Aklavik, *7311;* Campbell Lake, *1953;* ESKIMO LAKE BASIN: *3006, 3047;* Setidgi L., *3114;* GREAT BEAR LAKE: McTavish Arm, *5249.*

Rare in the northern parts of the district, barely reaching to the edge of the timber.

Arctostaphylos alpina (L.) Spreng.

MACKENZIE RIVER DELTA: East Branch, *7276;* Kittigazuit Isl., *2385A;* ARCTIC COAST: Atkinson Pt., *2645;* ESKIMO LAKE BASIN: *3005;* GREAT BEAR LAKE: McTavish Arm, *5246;* KEEWATIN DISTR.: *Seton & Preble 78353* (Can); Thelon Sanctuary, *C. H. D. Clarke 817, 818.*

Occasional in acid sandy or gravelly places, chiefly on the pre-Cambrian rocks.

Arctostaphylos rubra (Rehd. & Wils.) Fern.

Very common on the Arctic Coast from Herschel Island east to Coronation Gulf and south to Great Bear and Great Slave Lakes, apparently preferring calcareous soil and for this reason best developed on the Palaeozoic rocks. The plant recorded by Simmons, l. c., 118, under *A. alpina*, from Banks and Victoria Islands, probably belongs here.

Oxycoccus microcarpus Turcz. See Porsild in Can. Field Nat. **52**: 116–117. 1938.

MACKENZIE RIVER DELTA: Campbell L., *1949;* ESKIMO LAKE BASIN: *3004;* GREAT BEAR LAKE: North shore, *5047;* Smith Arm, *5013;* McTavish Arm, north shore, *5245;* south shore, *3753;* KEEWATIN DISTR.: Yathkyed Lake on Kazan R., *5839.*

Common in sphagnum bogs of the forested country, extending but a short distance beyond the limit of trees.

DIAPENSIACEAE

Diapensia lapponica L.

KEEWATIN DISTR.: Yathkyed Lake on Kazan R., *5844;* Casba Lake, *Tyrrell 23114* (Can).

An eastern species which reaches but a short distance west of Hudson Bay.

Diapensia obovata (Fr. Schm.) Nakai. See Porsild in Trans. Royal Soc. Can. ser. 3, sect. 5, **32**: 35. 1938.

RICHARDSON MTS.: West of Mackenzie Delta, barren granite scree, 3000′ elev., *6708;* lower slopes, elev. 1500′, *6845, 7344.*

In the National Herbarium of Canada are several collections from central Yukon, but so far the species has not been collected east of the Mackenzie.

PRIMULACEAE

Primula borealis Duby. See Fernald in Rhodora **30**: 94. 1928.

GREAT BEAR LAKE: Dease Arm, north shore, *4713;* McTavish Arm, north shore, *5180.*

A western species common along the Arctic Coast eastward to Cape Bathurst; apparently rare in the interior.

Primula incana M. E. Jones. See Fernald in Rhodora **30**: 72. 1928.

Mackenzie River: Bear Rock, near Ft. Norman, *3390*.

Not previously recorded from north of Great Slave Lake.

Douglasia arctica Hook. Fl. Bor.-Am. **2**: 120. 1838; Ostenf. in Gjöa Exp. 60. 1909; Holm & Macoun in Rept. Can. Arct. Exp. **5A**: 18. 1921; Constance in Am. Midl. Nat. **19**: 258. 1938.

Arctic Coast of Yukon Territory: Shingle Pt., *6730;* between King and Kay Pts., *7193;* Richardson Mts.: West of Mackenzie Delta, between 3000 and 4000′ elev., *6617, 6709, 6710, 6846.*

Hooker's statement, l. c., "Arctic sea-shore, between the Mackenzie and Coppermine Rivers. *Dr. Richardson,*" needs confirmation, since the species has not since been collected east of the Mackenzie, whereas it is quite common on the Arctic Coast to the westward and on alpine slopes of the Richardson Mountains, where it is found only on snow-flushes. The flowers appear shortly after the snow melts and during anthesis are almost hidden among the leaves. Following anthesis the peduncles rapidly elongate to about 2 cm. When past flowering, the plant is very inconspicuous and, due to the reddish brown color of the marcescent leaves, looks like a tuft of "moss." The flowers vary considerably in size and color, from 0.5 to 1 cm. in diam., and from rose-pink to deep purple. The seeds are large (1.8 × 1.3 mm.), dull, black and wrinkled, two in each capsule.

GENTIANACEAE

Gentiana Amarella L.

Great Bear Lake: Bear R., *3369, 3370;* Etacho Pt., 1500′ elev., *3510;* Leith Pt., south shore, *3552.*

A southern species, previously collected but once north of Great Slave Lake.

Gentiana arctophila Griseb. in Hook. Fl. Bor.-Am. **2**: 61, *tab. 149.* 1838; Holm & Macoun, Rept. Can. Arct. Exp. **5A**: 19. 1921, in part.

Arctic Coast: Liverpool Bay, *2927;* Eskimo Lake Basin: *3072, 3073;* Great Bear Lake: McTavish Arm, north shore.

The above-cited specimens are a good match for Grisebach's description and plate. *Gentiana arctophila* is no doubt closely related to the widely distributed *G. propinqua,* but it is a much lower plant; well-developed specimens as a rule are freely branched from the base, with strongly ascending branches. The terminal flower is much larger than the lateral ones. The corolla is funnel-shaped; the lobes are elliptic, distinctly mucronate, half as long as the tube in the terminal flower while equaling it in the lateral ones. The seeds average 0.8 × 0.6 mm. and are short-elliptic, round, not flattened in cross-section, light brown, smooth, but not shiny.

Gentiana ? detonsa Rottb., Griseb. in Hook. Fl. Bor.-Am. **2**: 64. 1838, as regards plant of "Arctic Sea-shore" (as *G. detonsa* [Fries]). For discussion of the nomenclature, history, and identity of this plant see Morten P. Porsild in Medd. om Grønl. **93**[3]: 43–52. 1935.

Arctic Coast: Atkinson Pt., on a dry, sandy slope 8 miles from the coast, Aug. 1–3, 1927, *2653.*

Theo. Holm, who, in Ott. Nat. **15**: 175–183. 1901, revised the American members of the Section *Crossopetalae,* denied the presence in America of *G. detonsa* (*G. serrata* Gunn.), without, however, attempting to determine what plants

Grisebach, l. c., had had in mind. East of the Mackenzie Delta the writer, in 1927, collected a series of specimens of a gentian that in the field he at once identified with the *G. detonsa* with which he was familiar in Greenland. When compared with specimens from Greenland and Norway, it becomes apparent that the series differs somewhat from typical *G. detonsa*. In the Mackenzie plant the lobes of the corolla taper to a narrow point, whereas in the Greenland plant they are oblong and rather obtuse; also, the basal leaves in our plant are somewhat broader and more obtuse. Since the plant otherwise is a close match for typical *G. detonsa*, the writer, at least until further collections are made, prefers to retain it under this name.

Gentiana Raupii sp. nov.

Gentiana elegans sensu Raup in Nat. Mus. Can. Bull. **74**: 157. 1935, in Jour. Arn. Arb. **17**: 290. 1936, non Nels.

Gentiana procera sensu Porsild in Rhodora **41**: 279. 1939, non Holm.

Herba annua glaberrima, caules tenues, obscure purpurascentes, angulati, simplices vel e basi nodisque ramosi, 2–60 cm. alti; folia basalia oblanceolata, brevipetiolata; folia caulina opposita, 2- vel 3-juga, lineari-lanceolata, sessilia, subamplexicaulia; pedunculi longi, uniflori; calyx purpureo-viridis, fere ad medium fissus, lobi subaequales, lanceolati, acuminati, marginibus membranaceis, obscure carinatis glaberrimi; corolla tenuis, purpureo-cyanea, 1–4 cm. longa, 4-lobata, fere ad medium incisa, lobis oblongo-truncatis, margine fimbriatis, apice erosodentatis; glandulae nectariferae praesentes; stamina 4, filamentis glabris, dilatis vel infra alatis; stylus liber, latitudinem stigmatis semilunaris bilobati aequans; semina oblonga, papillis brevibus obtusis dense tecta.

Mackenzie River: Near Blackwater R., 62° 63′, alluvial clay banks, Sept. 17, 1931, *A. E. Porsild 6571* (type); ramparts below Good Hope, *3403; M. Jones*, 1903, *62299* (Can); Great Slave Lake: *C. F. Howe 91958* (Can); *G. S. Hume 102678* (Can); Wood Buffalo Pk.: *H. M. Raup 3026, 3028*, distr. as *G. elegans;* Alaska: Richardson Highway, between Summit and McCarthy, *A. E. & R. T. Porsild 440* (distr. as *G. procera*).

Gentiana Raupii is closely related to *G. procera*, *G. Macounii*, and *G. elegans*, but it differs from all in being less leafy and in the absence of the very characteristic papillose keels of the calyx-lobes; the style is longer than in the first two but much shorter than in *G. elegans;* from *G. detonsa* it may at once be distinguished by the fringed corolla-lobes.

It appears to be common in the Mackenzie Basin in alluvial meadows and on clay banks. In the type locality flowering and fruiting specimens were collected together.

Gentiana glauca Pall.

Richardson Mts.: West of Mackenzie Delta, *6618, 7345.*

Not previously recorded from the Northwest Territories.

Lomatogonium rotatum (L.) Fries.

Pleurogyne rotata (L.) Griseb., Holm & Macoun in Rept. Can. Arct. Exp. **5A**: 19, *tab. XI, fig. 3.* 1921.

Pleurogyne Carinthiaca sensu Holm & Macoun, ibid., non Wulf. See Fernald in Rhodora **21**: 197. 1919.

Arctic Coast of Yukon Territory: Shingle Pt., *7113;* Arctic Coast: West of Mackenzie, Tuktuayaktoq, *7437;* Atkinson Pt., *2654;* Cape Dalhousie, *2789;* Kugaruk, west of Anderson R., *3087;* Great Bear Lake: McTavish Arm, north shore, vicinity of cold mineral spring, *5183.*

Our specimens from the Arctic Coast west of the Mackenzie match the plant which Holm and Macoun referred to *P. Carinthiaca.* It differs from typical *L.*

rotatum in its shorter and broader calyx-lobes, its slender and less strict growth, and in its smaller seeds; these are dark brown and average 0.4 × 0.2 mm. as compared with 0.6 × 0.3 mm. in typical *L. rotatum* (in *P. Carinthiaca,* according to Hegi, Fl. Mitteleur. **5**[3]: 1977, 0.5–0.7 × 0.3–0.5 mm.). Our plant also is not halophilous but, like *Gentiana propinqua* and *G. arctophila,* grows in herb mats, often far from the sea-shore.

In view of the polymorphism in *L. rotatum,* I am here, with Fernald, l. c., maintaining the plant under this name.

Menyanthes trifoliata L.

Mackenzie River Delta: Campbell Lake, *1956;* Arctic Coast: East of Kittigazuit, *2514;* Eskimo Lake Basin: Setidgi L., *3117;* Great Bear Lake: McTavish Arm, east shore, *3754, 5355;* north shore, *5250;* north shore, Haldane R., *5049;* Keewatin Distr.: Yathkyed Lake on Kazan R., *5842.*

Somewhat rare in the wooded country, occasionally extending beyond the limit of trees. In the Mackenzie District *M. trifoliata* is a late-flowering species which matures fruit only in favorable seasons. Compare also Fernald, in Rhodora **31**: 105. 1929, and Porsild, ibid. **41**: 281. 1939.

POLEMONIACEAE

Phlox Richardsonii Hook. Fl. Bor.-Am. **2**: 73, *tab. 160.* 1838; Holm & Macoun, Rept. Can. Arct. Exp. **5A**: 19. 1921.

Richardson Mts.: West of Mackenzie Delta, 2500–3000′ elev., *6712.*

Our plants grew on volcanic tufa and formed large, loose mats. The leaves are lanceolate, not subulate, and the flowers are large, 1.5 to 2 cm. in diameter.

Polemonium acutiflorum Willd. See Hultén, Fl. Kamtch. **4**: 72. 1930.

Polemonium coeruleum L. var. *villosum* (Rud.) Brand, Ostenf. in Gjöa Exp. 62. 1909; Holm & Macoun in Rept. Can. Arct. Exp. **5A**: 19. 1921.

Richardson Mts.: West of Mackenzie Delta, *6619, 6713, 6848;* Arctic Coast of Yukon Territory: Shingle Pt., *6909, 7112;* King Pt., *7194;* Mackenzie River Delta: Richards Isl., *2276;* Arctic Coast: Liverpool Bay, *2928.*

Polemonium acutiflorum is an Asiatic species which in western America reaches but a short distance east of the Mackenzie. It inhabits moist, fertile slopes and snow-flushes, where it flowers late and in some seasons does not mature seed.

Polemonium pulcherrimum Hook. in Bot. Mag. **57**: *tab. 2979.* 1830; Brand in Pflanzenr. 27 (IV. **250**): 34. 1907.

Mackenzie River Delta: Campbell Lake, *1959;* East Branch, *7043;* Eskimo Lake Basin: *6937;* Great Bear Lake: Etacho Pt., 1500′ elev., *3511.*

Our plants match a large series in the National Herbarium of Canada from Yukon Territory, Alaska, and British Columbia, lying mostly under *P. humile.* Although Hooker himself, in Fl. Bor.-Am., reduced *P. pulcherrimum* to an unimportant variation of *P. coeruleum,* there can be little doubt that the plant is abundantly distinct. *Polemonium pulcherrimum* apparently is restricted to calcareous soils. We collected it on ledges of limestone cliffs, where it flowers very early. The plant is very viscid and fetid of odor. The flowers are much smaller than in *P. acutiflorum,* while the seeds are quite wingless and more or less lustrous. The plant from Bear Lake differs somewhat by its larger flowers and by being less viscid.

BORAGINACEAE

Lappula Redowskii (Hornem.) Greene var. **occidentalis** (Wats.) Rydb.

ESKIMO LAKE BASIN: *3050.* Previously known in the district northward to Great Bear Lake.

Eritrichium aretioides (Cham. & Schlecht.) DC.

ARCTIC COAST OF YUKON TERRITORY: Between King and Kay Pts., *7159.*

A rare plant, known in North America from a few places in arctic Alaska and Yukon Territory. See Porsild in Rhodora **41**: 282. 1939, where first recorded from Canada.

Mertensia paniculata (Ait.) G. Don. See L. O. Williams in Ann. Mo. Bot. Gard. **24**: 42. 1937.

Mertensia pilosa (Cham.) G. Don, Ostenf. in Gjöa Exp. 63. 1909.

ARCTIC COAST OF YUKON TERRITORY: Between King and Kay Pts., *7192,* where previously collected by the Gjöa Expedition.

The record in Fl. Bor.-Am., under *Lithospermum paniculatum,* from Great Bear Lake, needs confirmation.

LABIATAE

Stachys palustris L.

MACKENZIE RIVER: Lat. 62° 30′, *6564.* Common in the upper Mackenzie basin and recorded in Fl. Bor.-Am. from Great Bear Lake.

Greene, Pitt. **3**: 342. 1898, has proposed the name *S. scopulorum* for the western plant. Rydberg and most recent writers have taken up that name, but the plant of Alaska and Mackenzie, at least, seems inseparable from the almost circumpolar *S. palustris* L.

SCROPHULARIACEAE

Limosella aquatica L.

GREAT BEAR LAKE: McTavish Arm, east shore, *5357;* south shore, *3684, 3708.*

Our specimens grew in small, shallow ponds on granite hills and were in fruit the second week of August. The seeds are 0.6 to 0.7 mm. long and conspicuously transversely wrinkled. Although perhaps often overlooked, *L. aquatica* is a rare plant in Canada and has been collected but a few times from southern Labrador to British Columbia. Previously known north to Lake Athabaska and Churchill, Man. (*A. E. Porsild 5499*).

Veronica alpina L. var. **unalaschcensis** Cham. & Schlecht. See Fernald in Rhodora **41**: 447–457. 1939.

Veronica Wormskjoldi Roem. & Schult.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3512;* KEEWATIN DISTR.: Lake on Tha-anne R., *5600.*

New to the flora of the Mackenzie and Keewatin Districts.

Lagotis Stelleri (Cham. & Schlecht.) Rupr.

Gymnandra Stelleri (Cham. & Schlecht.) Hook. Fl. Bor.-Am. **2**: 102. 1838.

Lagotis glauca Gärtn., Ostenf. in Gjöa Exp. 66. 1909.

Lagotis glauca Gaertn. var. *Stelleri* Cham. & Schlecht., Macoun & Holm in Rept. Can. Arct. Exp. **5A**: 20. 1921.

ARCTIC COAST OF YUKON TERRITORY: King and Kay Pts., *7198;* RICHARDSON MTS.: West of Mackenzie Delta, wet alpine tundra, between 2000′ and 4000′ elev., *6715, 6850.*

A western species which barely reaches the Mackenzie River. See also Porsild in Rhodora **41**: 283–284. 1939.

Castilleja hyperborea Pennell in Proc. Acad. Nat. Sci. Phil. **86**: 532. 1934; see also Porsild in Rhodora **41**: 284. 1939.

Richardson Mts.: West of Mackenzie Delta, dry, sandy ridges, 800′–2000′ elev., *6851;* Mackenzie River Delta: Campbell Lake, gravelly limestone plateau.

Apparently an endemic species of Alaska and Yukon Territory, which has reached the eastern bank of the Mackenzie Delta.

Castilleja pallida (L.) Spreng. ssp. **caudata** Pennell in Proc. Acad. Nat. Sci. Phil. **86**: 524. 1934.

Castilleja septentrionalis Hook. Fl. Bor.-Am. **2**: 105. 1838, at least as regards plant of "Arctic Sea-coast."

Castilleja pallida (L.) H. B. K., Ostenf. in Gjöa Exp. 64. 1909; Simmons, Phytogeogr. Arct. Am. Arch. 122. 1913.

See also Porsild in Rhodora **41**: 285. 1939.

Arctic Coast of Yukon Territory: Common between King and Kay Pts., *7160;* Mackenzie River Delta: Husky R., *6623;* Campbell L., *2010.*

The plant recorded from Banks and Victoria Islands by Simmons (as var. *septentrionalis*) probably belongs here. Apparently an endemic species of Alaska and Yukon Territory, which reaches east to the Mackenzie Delta and north to Banks Island.

Castilleja pallida (L.) Spreng. ssp. **elegans** (Ostenf.) Pennell in Proc. Acad. Nat. Sci. Phil. **86**: 526. 1934.

Castilleja elegans Ostenf. in Rhodora **36**: 187. 1934.

Castilleja pallida (L.) Spreng. var. *unalaschkensis* sensu Ostenf. in Gjöa Exp. 64. 1909, non Cham. & Schlecht.

See also Porsild in Rhodora **41**: 285–286. 1936.

Eskimo Lake Basin: Narrows between 3rd and 4th lakes, *3049;* Arctic Coast: Cape Dalhousie, *2790;* Liverpool Bay, *2929;* Great Bear Lake: Dease Arm, Narakay Isl., *4851;* Keewatin Distr.: Mistake Bay, *5721.*

The above series differs from the typical plant in being densely caespitose, often forming large, dense clumps, and in having long yellow wool in the inflorescence.

The subspecies *elegans* is common from the north shore of Alaska to Hudson Bay on the "barren grounds" north of the wooded country. It is not a truly arctic species, however, and seems best developed in the southern parts of its range.

Castilleja pallida (L.) Spreng. ssp. **typica** Pennell in Proc. Acad. Nat. Sci. Phil. **86**: 522. 1934.

Mackenzie River Delta: Richards Isl., *2119, 2273;* Arctic Coast: 6 miles east of Kittigazuit, *2515;* Atkinson Pt., *2655;* Great Bear Lake: North shore, Haldane R., *4963A;* McTavish Arm, north shore, *5159, 5184.*

The above series is rather uniform. The stems are few and ascending from a weak base, puberulent throughout; the leaves are puberulent, narrow, and entire; the inflorescence is short and not very woolly.

The ssp. *typica* is common in sandy places along the Arctic Coast and south to Great Bear Lake, thus covering practically the same range as ssp. *elegans*.

Castilleja Raupii Pennell in Proc. Acad. Nat. Sci. Phil. **86**: 528. 1934, fig. on p. 529; Raup in Jour. Arn. Arb. **17**: 294. 1936.

Keewatin Distr.: Yathkyed Lake on Kazan R., *5845.*

Apparently common from Hudson Bay west to the upper Mackenzie Basin. In the Keewatin District it is a late-flowering southern species.

Castilleja Raupii ssp. **ursina** Pennell in Proc. Acad. Nat. Sci. Phil. **86:** 530. 1934.

MACKENZIE RIVER DELTA: Richards Isl., *2119A;* Kittigazuit Isl., *2310;* East Branch, *7045.*

The ssp. *ursina* appears to be more branched than any other northern member of the genus. It seems to be an endemic of the Mackenzie Valley, and the type came from Great Bear River (*Miss E. Taylor 86,* Can).

Castilleja septentrionalis Lindl. in Bot. Reg. **11:** *tab. 925.* 1825; Pennell, Scroph. of E. & Temp. N. Am. 553. 1935.

Castilleja pallida var. *septentrionalis* (Lindl.) Gray, Syn. Fl. N. Am. **2**[1]: 297. 1886.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3513;* north shore, near Haldane R., *4963.*

An eastern species common in temperate and boreal Atlantic North America, west to James Bay and north to southern Baffin Island, with isolated stations west to Alberta. The above stations from Bear Lake constitute the first authentic records from the continental Northwest Territories.

Euphrasia disjuncta Fern. & Wieg. in Rhodora **17**: 190. 1915.

GREAT BEAR LAKE: Bear River, *3271, 3371.*

Erroneously recorded from the Northwest Territories (Mackenzie District) by Fernald & Wiegand, l. c., based upon Dawson's collection from Lewes R., in the Yukon Territory (*17449,* Can). *Euphrasia disjuncta* is a bicentric species known from Atlantic North America and from the Alaska-Yukon region; the above collection extends the range to the Mackenzie District.

Rhinanthus groenlandicus Chab.

MACKENZIE RIVER: Near Root R., 62° 30′ N., *6562.*

Pedicularis arctica R. Br. Chlor. Melv. 32. 1823. For synonymy see Simmons, Vasc. Pl. Ellesmereland 30. 1906, and Hultén, Fl. Kamtch. **4**: 116–118. 1930.

Since Brown's name was published there has been much confusion with regard to its proper application. Some writers have considered it a synonym of *P. Langsdorffii* Fisch. ex Stev., while others have considered the plant of arctic Canada a race or variety of the Bering Sea plant. Much of the uncertainty seems to have centered around the question of which name held priority in point of date of publication, and the actual identity of the two plants seems to a large extent to have been neglected.

To the writer, who is familiar with both plants in the field, it seems most natural to consider them specifically distinct, even though phylogenetically related. Simmons, l. c., has pointed out that *P. arctica* "shows great resemblance in habit" to *P. hirsuta.* As a matter of fact, specimens of *P. hirsuta* with bidentate galea are not uncommon in northwestern Greenland and have even been observed in material from arctic Europe (Torne Lappmark, Jukkasjarvi Tesivara, 750 m., July 11, 1926, *G. Alm,* Can). Other characters also, including those of the fruits, show that *P. arctica* and *P. hirsuta* are really very closely related, although according to the arrangement used by most monographers of the genus they should be placed in separate sections. It would thus appear to be as logical to consider *P. arctica* a race or variety of *P. hirsuta* as *P. Langsdorffii.*

Pedicularis arctica is a common species along the shores of the Arctic Ocean and of the Arctic Archipelago, reaching the extreme northwest corner of Greenland. Although not a littoral species, it seems to be absent in the interior of the Mackenzie and Keewatin Districts.

Pedicularis flammea L.

GREAT BEAR LAKE: Keith Arm, Deerpass Bay, *3464;* Dease Arm, north shore, *4715, 4716, 4903;* south shore, Leith Pt., *3590;* KEEWATIN DISTR.: Yathkyed L. on Kazan R., *5847;* Baker L., *6128.*

An eastern species which in the Northwest Territories reaches to Bear Lake with an isolated station in Alaska.

Pedicularis hirsuta L.

An eastern species which reaches only to the west shore of Hudson Bay. Hooker (Fl. Bor.-Am.) clearly did not understand the genus well, and his record of *P. hirsuta* from Bear Lake needs confirmation.

Pedicularis lapponica L., Macoun & Holm in Rept. Can. Arct. Exp. **5A**: 19. 1921.

Richardson Mts.: West of Mackenzie Delta, *6622;* Mackenzie River Delta: East Branch, *6883;* Great Bear Lake: Dease Arm, Narakay Isl., *4850;* north shore, Haldane R., *4964;* Keewatin Distr.: Yathkyed Lake on Kazan R., *5864;* Lake on Tha-anne R., *5601.*

An eastern species, in our district rare or occasional west to the Mackenzie Delta. Previously known in the Mackenzie District only from a single collection in Coronation Gulf (*Can. Arct. Exp.*).

OROBANCHACEAE

Boschniakia rossica (Cham. & Schlecht.) B. Fedtsch.

Orobanche glabra Hook. Fl. Bor.-Am. **2**: 92. 1838.

Mackenzie River Delta: Husky R., *6624;* East Branch, *7047;* Richards Isl., *2120;* Eskimo Lake Basin: *3012;* Great Bear Lake: Bear R., Mt. Charles, *3352;* McTavish Arm, east shore, *3770, 5319;* south shore, *3609, 3635.*

Common in northern parts of the Mackenzie District in open spruce woods and alder thickets, extending north to the limit of trees. Previously recorded from Great Bear Lake by Hooker, l. c.

LENTIBULARIACEAE

Pinguicula villosa L.

Richardson Mts.: West of Mackenzie Delta, *6856;* Mackenzie River Delta: Richards Isl., *7077;* Campbell Lake, *1961;* Arctic Coast: 6 miles east of Kittigazuit, *2521;* Eskimo Lake Basin: 2nd lake, *3014;* Setidgi Lake, *3167;* Great Bear Lake: McTavish Arm, east shore, *5358;* Keewatin Distr.: Yathkyed Lake on Kazan R., *5841.*

Rare or occasional in sphagnum bogs of the wooded country north to the limit of trees or slightly beyond. Previously recorded from Great Slave Lake (*Raup*).

Utricularia intermedia Hayne.

Mackenzie River Delta: Pt. Separation, *1940;* Richards Isl., north end, *2275,* flowering specimens collected July 22, 1927; Eskimo Lake Basin: 2nd lake, *2013,* flowering specimens collected Aug. 18, 1927; Great Bear Lake: Smith Arm, north shore, *5015;* Dease Arm, north shore, *4722;* McTavish Arm, north shore, *5282;* south shore, *3647;* Leith Pt., *3553;* Keewatin Distr.: Lake on Tha-anne R., *5598.*

Previously known in our region northward to Great Bear Lake (*Richardson*). In this district *U. intermedia* flowers and probably also fruits in favorable seasons.

Utricularia minor L.

Great Bear Lake: North shore near Haldane R., *5051;* McTavish Arm, north shore, *5283;* Leith Pt., *3547.*

Previously known in this district northward to Great Slave Lake (*Raup*). All specimens were sterile.

Utricularia ochroleuca Hartm.

Mackenzie River Delta: South end of Richards Isl., 69° N., 134° 40′ W., with green algae in a wet *Carex* bog, July 22, 1934, *7076.*

Utricularia ochroleuca was first recorded from North America west of Greenland by Lily M. Perry, in Rhodora **33**: 124. 1931, who collected it on St. Paul

Island, N. S. Our specimens, like those of Dr. Perry, are sterile, but the characteristic shape and denticulation of the leaf-segments, the winter buds, and the presence of bladders on the immersed leaf-bearing stems make the determination quite certain.

Actually the first collection of *U. ochroleuca* in Canada came from the north shore of the Gulf of St. Lawrence, Saguenay Co., Quebec, Natashquan, Aug. 7, 1927, *H. F. Lewis* (Can) (distributed as *U. intermedia*).

Utricularia vulgaris L. var. **americana** Gray.

Mackenzie River Delta: East Branch, sterile but with large winter buds on Aug. 4, *7240, 7289;* Eskimo Lake Basin: Setidgi Lake, *3116, 3166;* Great Bear Lake: McTavish Arm, north shore, flowering specimens on Aug. 6, *5251.*

All of these specimens except the last were sterile and the species probably does not flower or fruit except in favorable years. Previously known in the district northward to Great Slave Lake (*Raup*).

PLANTAGINACEAE

Plantago eriopoda Torr.

Arctic Coast: Tuktuayaktoq, *7438.*

As pointed out by Raup (in Jour. Arn. Arb. **17**: 297. 1936), Macoun's reference (Cat. **2**: 392) to material from the "Arctic Sea" probably refers to *P. septata* Morris, and *P. eriopoda* is thus new to the flora of our region.

Plantago juncoides Lam. var. **glauca** (Hornem.) Fern. in Rhodora **27**: 101. 1925.

Mackenzie River Delta: Husky R., June 20, 1931, *O. Bryant* (Can); Great Bear Lake: McTavish Arm, north shore, by a salt spring, *5187.*

Apparently new to the flora of our region.

Plantago septata Morris in Bull. N. Y. Bot. Gard. **2**: 182. 1901.

Plantago lanceolata β Hook. Fl. Bor.-Am. **2**: 123. 1838; Macoun & Holm, Rept. Can. Arct. Exp. **5A**: 20. 1921.

Mackenzie River Delta: East Branch, *7048;* Campbell Lake, *1963, 1964;* Kittigazuit Isl., *2396;* Arctic Coast: Cape Dalhousie, *2796;* Liverpool Bay, *2935;* Great Bear Lake: Bear River, *3394;* Dease Arm, north shore, *2723;* Dease Valley, *4852.*

In our district *P. septata* grows in dry calcareous soil. Our specimens well match the description. Rydberg (Fl. Rocky Mts.) states in his key: "plant not woolly at the base," but in the text he says "woolly, especially below," which is correct. Morris, l. c., says: "seeds two." In our material the capsule is as often 3-locular with one seed in each compartment.

Plantago septata appears to be common in Yukon Territory and northwestern Mackenzie. It reaches east to Coronation Gulf and south to the mountains of Alberta and Montana. The species was described from central Yukon Territory, not "Alaska," as stated in the Gray Index. Unlike *P. criopoda,* it is nonhalophytic.

RUBIACEAE

Galium boreale L.

Mackenzie River Delta: Campbell Lake, *1962, 2016;* Great Bear Lake: Bear R., Mt. Charles, *3338, 3353;* Porcupine R., *3372.*

Galium Brandegei Gray. See Porsild in Rhodora **41**: 289. 1939.

Mackenzie River Delta: Husky R., *7346;* Eskimo Lake Basin: Setidgi L., *3118;* Great Bear Lake: McTavish Arm, east shore, *3699, 3709;* south shore, *4879;* Keewatin Distr.: Lake on Tha-anne R., *5599.*

A common species in wet *Carex* bogs and on the margins of ponds and sloughs of the lowland, reaching north to the limit of trees or slightly beyond. Not previously recorded from the Northwest Territories.

Galium trifidum L.

MACKENZIE RIVER DELTA: Aklavik, *7313;* ESKIMO LAKE BASIN: 2nd lake, *3015;* GREAT BEAR LAKE: Keith Arm, Deerpass Bay, *3444;* MACKENZIE RIVER: Above Sans Sault Rapid, *3401.*

A southern woodland species in our district, rare or occasional in favorable places north to the tree limit. Previously known northward to Ft. Smith (*Raup*).

CAPRIFOLIACEAE

Viburnum edule (Michx.) Raf.

MACKENZIE RIVER DELTA: Campbell Lake, *2014;* ESKIMO LAKE BASIN: Setidgi Lake, *3165;* GREAT BEAR LAKE: Bear R., *3246;* McTavish Arm, *3755, 5252, 5317.*

Occasional on the lower Mackenzie and at Great Bear Lake.

VALERIANACEAE

Valeriana capitata Pall.

Valeriana bracteosa Britt. in Bull. N. Y. Bot. Gard. **2**: 183. 1901.

RICHARDSON MTS.: West of Mackenzie Delta, *6721, 6858;* ARCTIC COAST OF YUKON TERRITORY: King Pt., *7156;* MACKENZIE RIVER DELTA: Aklavik, *1965;* Richards Isl., *2278.*

An Asiatic species common in Alaska and Yukon, and having its eastern limit at the Mackenzie Delta; Hooker's statement, "Between the Coppermine and Mackenzie Rivers," needs confirmation. The plant of the interior is taller and the inflorescence is less "capitate" (*V. bracteosa* Britt.), but it differs in no other way from *V. capitata.* The species is not truly arctic, and north of the limit of trees it does not normally produce mature fruits.

Valeriana septentrionalis Rydb.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3514.*

Not previously recorded from the Northwest Territories.

CAMPANULACEAE

Campanula uniflora L.

RICHARDSON MTS.: West of Mackenzie Delta, *6859.*

A species of peculiar and disrupted range, common in the Eastern Arctic west to Keewatin, in the Arctic Archipelago, and along the Arctic Coast west to Coronation Gulf. Apparently absent in Yukon Territory, with an isolated station in the Richardson Mts.

COMPOSITAE

Aster alpinus L. spp. **Vierhapperi** Onno in Bibl. Bot. **26**[Heft 106]: 25, *tab. 6, fig. 4.* 1932.

GREAT BEAR LAKE: Bear River, dry slopes near summit of Mt. Charles, *3340;* Bear Rock, 1300′ elev., *3379;* Smith Arm, north shore, *3087.*

This is *A. alpinus* of some American authors but not of Linnaeus; it is closely related to *A. culminis* A. Nels., placed by Rydberg under *A. alpinus.* From *A. alpinus* of Europe it differs in having the stem glandular below the head, the basal leaves 1-nerved, the bracts more obtuse and purple-tipped, and the rays pure white, not golden yellow or rose.

Onno's description, l. c., is so brief that the plant can hardly be recognized by it, but the plate, as well as specimens annotated by Onno in the Gray Herbarium, leave no doubt as to which plant is meant.

Our plant may be described as follows: Perennial from a branching, stout, subligneous rootstock; basal leaves numerous, oblanceolate, obtuse, 3–6 cm. long, 0.5–0.7 cm. wide, 1-nerved; cauline leaves 5–8, linear, the upper ones much reduced. Leaves, stems, and bracts invested with very short, scattered strigose hairs, both surfaces of the leaves in addition covered with pale yellowish resinous dots, visible under 25 × magnification. Stems few, stiffly erect, not at all ascending, 10–15 (–25) cm. high, dark green with conspicuous reddish ribs; heads solitary, large, 3–4 cm. in diam., 1.5 cm. high; bracts 0.7 cm. long, obtuse, prominently tipped and margined with purple; ligules 1–1.4 cm. long and about 0.2 cm. wide, white and papery; achenes flat, cuneate, about 0.3 cm. long, strigose; pappus sordid, simple. The entire plant in life is viscid-mealy to the touch and the flowering heads are very showy.

Distribution: Mountains of Alberta, with isolated stations in Alaska, Yukon, and at Great Bear Lake.

Aster Lindleyanus T. & G.

Great Bear Lake: Bear R., Mt. Charles, *3344.*

Only sterile leaf-rosettes could be found and the species may not flower and fruit here except in favorable years. Previously known northward to Great Slave Lake (*Raup*).

Erigeron acris L. var. **asteroides** (Andrz.) DC.

Great Bear Lake: Keith Arm, Russel Bay, *3413;* Dease Arm, north shore, *4726, 4816;* McTavish Arm, *3612, 3687, 3756.*

Erigeron compositus Pursh.

Mackenzie River Delta: East Branch, *6895, 7006, 7058;* Campbell Lake, *2018;* Arctic Coast: Kittigazuit Isl., *2403;* Atkinson Pt., *2662;* Cape Dalhousie, *2802;* Liverpool Bay, *3091;* Great Bear Lake: Dease Arm, Narakay Isl., *4855;* Smith Arm, north shore, *5020;* McTavish Arm, north shore, *5318.* In addition to the numbers listed above, which are all typical, the following belong to the var. *trifidus* (Hook.) Gray: Great Bear Lake: Bear R., Mt. Charles, *3442;* McTavish Arm, south shore, *3637, 3659.*

Erigeron eriocephalus J. Vahl.

Arctic Coast: Atkinson Pt., *2663;* Cape Dalhousie, *2803;* Coppermine R., *A. M. Berry 22, 23* (Can); Mackenzie Distr.: Thelon R., 63°–64° N., *J. W. Tyrrell 106115* (Can).

Our specimens are a good match for typical plants from Greenland.

Erigeron grandiflorus Hook. Fl. Bor.-Am. **2:** 18, *tab. 123.* 1834.

Mackenzie River Delta: Campbell Lake, *1970, 2019;* Arctic Coast: Cape Dalhousie, *2804;* Liverpool Bay, *2940, 2950.*

A western species of Alaska and Yukon which reaches eastward along the Arctic Coast to Anderson R., and in the mountains south to high peaks of Alberta.

Antennaria angustata Greene, Pitt. **3:** 284. 1898; Malte in Rhodora **36:** 115. 1934; Polunin, Bot. Can. E. Arct. 347. 1940.

Antennaria nitens Greene in Ott. Nat. **25:** 42. 1911.

Keewatin Distr.: Lake on Tha-anne R., *5604, 5605.*

In its typical form, *A. angustata* is a well-marked species common in W. Greenland, S. Baffin Island, N. Labrador, and the Hudson Bay region. In Keewatin the species becomes rare and less typical. A form which puzzled both Malte and Polunin is *A. nitens* Greene, collected in Wager Inlet by *J. M. Macoun* (*79269,* type, Can). It consists of three rather poor individuals collected on Sept. 8, 1910. In the discussion following the description, Greene, l. c., adds: "quite past flowering . . . and had even shed most of their pappus, enough of which has remained, however, to show their very marked character of being

almost plumose in the middle and upper portion . . . I can hardly doubt that the plants are all staminate. The appearance of the involucres seem to indicate this, as well as the subplumose pappus."

The three aforementioned specimens, now at any rate, show no single trace of pappus or achenes, and it is evident that Malte, l. c., when copying Greene's diagnosis, overlooked the discussion; hence his remark, l. c., "only the female plant known." Until better material is available, *A. nitens* is perhaps best treated as a form of *A. angustata,* which, through age, has become almost entirely glabrous.

In the National Herbarium of Canada are four sheets of a plant from high mountains of Alberta and British Columbia: Alberta: Forget-me-not Mt., *J. Macoun 18497;* Lake Louise, *J. M. Macoun 65428;* British Columbia: Skagit R., *J. M. Macoun 69336,* and Columbia R., *Spreadborough 19658.* These were labelled by Greene with a name which apparently was never published, while they were referred by Rydberg to *A. monocephala.* All of these, no doubt, should be referred to *A. angustata* Greene.

Antennaria canescens (Lange) Malte in Rhodora **36:** 109. 1934.

Antennaria alpina (L.) Gaertn. *β canescens* Lange, Fl. Dan. **16:** *tab. 2786, fig. 1–3.* 1869.

KEEWATIN DISTR.: West coast of Hudson Bay, Mistake Bay, *5723;* Yathkyed Lake on Kazan R., *5854;* lower Kazan R., *6068.*

Antennaria canescens appears to be a well-marked species of Greenland, S. Baffin Island, northern Labrador, and the Hudson Bay region, reaching west only to central Keewatin.

Antennaria compacta Malte in Rhodora **36:** 111. 1934.

Antennaria candida sensu Macoun & Holm in Rept. Can. Arct. Exp. **5A:** 21. 1921, non Greene.

ARCTIC COAST: Cape Dalhousie, *2801;* GREAT BEAR LAKE: Bear R., Mt. Charles, 1500′ elev., *3306, 3347;* Dease Arm, Narakay Isl., *4853;* McTavish Arm, north shore, *5210.*

The plants from Great Bear Lake are almost pulvinate with short and rather broad, almost imbricate basal leaves; the flowering stems are 10–15 cm. high. The achenes are glabrous.

Antennaria crymophila sp. nov.

Planta rhizomate brevi percrasso subligneo praedita, rosulas implicatas numerosas steriles sessiles edens; folia basalia spathulata, obtusa, 1 cm. longa, 0.3 cm. lata, per annos persistentia, utrinque conferte adpresse albo-tomentosa, adulta plumbaginea; rami florigeri ca. 10 cm. alti, rigidi, tomento ablato atro-brunnei, folia caulina 6–8 sat remota valde diminuta apice scariosa gerentes; corymbus laxiflorus, corymbulis 4 pro ratione magnis longe pedunculatis constans; involucrum ca. 0.6 cm. longum, bractearum seriebus 4 vel 5, bracteis basi evidenter atris, apice obtusis, pallide stramineis, pappo subrufo; styli vix exserti; nuculae maturae olivaceae setulis paucis at conspicuis indutis; planta mascula ignota.

MACKENZIE RIVER DELTA: East Branch, 68° 55′ N., dry, gravelly places, July 21, 1934, *A. E. Porsild 7053* (TYPE).

Antennaria crymophila is a well-marked species of the Sect. *Dioicoideae* (Sched.), perhaps most closely related to *A. pulvinata* Greene of the mountains of Alberta and British Columbia, but differing from it in the open corymbs, taller habit, and strongly developed rootstocks. Thus far known only from the type locality.

Antennaria Ekmaniana nom. nov.

Antennaria angustifolia E. Ekman, Sv. Bot. Tidskr. **21:** 53, *tab. 1, figs. 1, 2, 12.* 1927, non Rydb. in Bull. Torr. Bot. Cl. **26:** 546. 1899.

Antennaria Friesiana sensu E. Ekman, ibid. **22**: 416. 1928, as to plant discussed, not as to type, *A. alpina* var. *Friesiana* Trautv. in Acta Hort. Petrop. **6**: 24. 1878.

Antennaria labradorica sensu Fern. in Rhodora **33**: 223. 1931, non Nutt. in Trans. Am. Phil. Soc. new ser. **7**: 406. 1841; sensu Malte in Rhodora **36**: 112. 1934; sensu Polunin, Bot. Can. E. Arct. 350. 1940.

The late Mrs. Elizabeth Ekman, l. c., under *A. angustifolia,* described and illustrated a plant which had formerly passed as *A. alpina* (L.) Gaertn. in Greenland and in North America. Unfortunately the name chosen, which so well described the plant, was preoccupied by *A. angustifolia* Rydb. *Antennaria Fricsiana,* based upon *A. alpina* var. *Friesiana* Trautv., as first suggested by Fernald, l. c., and later definitely proved by Malte, l. c., was an unfortunate substitution. Fernald further suggested that Ekman's plant is probably the long obscure *A. labradorica* Nutt., of which he discovered fragments thus labeled in the British Museum of Natural History, London. In his posthumously published revision of the arctic species of *Antennaria,* Malte, without contributing any new proof, accepted Fernald's interpretation of Ekman's plant.

The plant which Nuttall described as *A. angustifolia* came from the herbarium of Schweinitz, who was bishop of the Moravians, and who undoubtedly had received it from missionaries in Labrador, whereas Ekman's plant is truly arctic and, as far as the writer is aware, has not been collected in Labrador proper.

Nuttall's diagnosis is very brief but it contains several statements which seem to show that he could not possibly have had the narrow-leaved, rhizomatous arctic plant in mind. Thus, "sarments procumbent, flowering" generally would be understood to mean long, slender runners, and Nuttall would hardly have used that term if he had wished to describe the sessile innovations so characteristic for the arctic plant. Malte, l. c., 103, who himself stressed the taxonomic importance in this genus of the "presence or absence of stolons," in the Latin diagnosis of some of his new species translated "basal offshoots" with "sarmentis," even where sessile innovations were meant. This certainly is very misleading and "innovationes" perhaps would have been a more correct term.

Nuttall further describes his *A. labradorica* as having "radical leaves spathulate-linear," whereas our plant has the narrowest leaves of all arctic species. Of the cauline leaves Nuttall says, "at length nearly smooth," while in our plants they are permanently lanate, as stated by Malte, l. c.

The identity of our plant with that of Nuttall becomes even more problematical when we read Nuttall's discussion, in which he says: "Apparently a very distinct species. At first glance resembling *A. alpina,* but more nearly allied to *A. plantaginea;* it is, however, a much smaller plant, the leaves not three-nerved . . .; the achenium is also perfectly smooth; . . ." In view of Nuttall's comparison of his species with *A. plantaginea,* Malte's remark, l. c., 144, loses some of its point when he states that Greene made "a wild guess" when (Pitt. **3**: 185), under *A. neodioica,* he ventured the suggestion that Nuttall with his *A. labradorica* might have meant that species. As a matter of fact, some specimens of *A. neodioica* var. *gaspensis* Fern. in the National Herbarium of Canada match Nuttall's description of *A. labradorica* much better than does the narrow-leaved, non-stoloniferous *A. angustifolia* of Ekman. The same may be said of *A. spathulata* Fern. and *A. appendiculata* Fern.

Malte also claimed that Greene (Pitt. **3**: 285) "made another unfortunate guess at the identity of Nuttall's *A. labradorica*" when he compared it with a plant now known as *A. ungavensis* (Fern.) Malte, collected by Spreadborough in northern Labrador (*44442,* Can). Since Malte himself points out that the

latter plant is stoloniferous and has broad rosette leaves, Greene again stands completely vindicated.

Finally, the achenes in *A. labradorica* of Fernald and Malte are not "perfectly smooth," as Nuttall states that those of his plant are; on the contrary the mature achenes in the large number of specimens examined by the writer all show the very characteristic hairs described and illustrated by M. P. Porsild (in Rhodora **33**: 218, *fig. 4*. 1931). These hairs appear to be particularly well-developed in plants from northern Greenland and from arctic northwest Canada.

Thus, while the identity of *A. labradorica* Nutt. is still obscure, there at least can be little doubt that it is not identical with the plant described by Mrs. Ekman as *A. angustifolia*. For the latter plant the new name *A. Ekmaniana* is proposed, in recognition of Mrs. Ekman's very real contribution toward the understanding of this well-marked species. As Mrs. Ekman has already pointed out, this plant is a truly arctic species, perhaps the most arctic in the genus. In Greenland it has not been collected south of Disco Bay.

Antennaria isolepis Greene.

GREAT BEAR LAKE: North shore, *4969;* Smith Arm, *5085;* Etacho Pt., 1500′ elev., *3516;* Keith Arm, Russel Bay, *3440;* south shore, Leith Pt., *3558;* McTavish Arm, north shore, *5211;* KEEWATIN DISTR.: Lake on Tha-anne R., *5603;* Yathkyed L., on Kazan R., *5853, 5855.*

The tomentum of the flowering stems appears to be somewhat viscid and late specimens are often covered with particles of dust and sand.

Common or occasional, particularly at some distance from the sea-coast, on sunny slopes where the snow remains late in the spring.

General Distribution: From northern Labrador to Alaska, north to Hudson Bay and Great Bear Lake.

Antennaria neoalaskana sp. nov.

Planta rhizomate brevissimo ascendente furcato subligneo instructa; innovationes sessiles, foliis spathulatis, 1–1.5 cm. longis, 0.2–0.3 cm. latis, apiculatis, utrinque leviter adpresse tomentulosis, demum glabratis; caules florigeri parcius floccosi, 5–8 cm. alti, crassi, saepe subcurvati, haud rigidi, foliis lineari-spathulatis 4–7, summis apice scariosis; corymbi laxi, juventute nutantes, plerumque tricapitulati, pedunculis brevibus crassis; involucrum foemineum circa 6 mm. altum, bracteis biserialibus, longe acuminatis, ulterioribus plus vel minus lanosis, juventute olivaceo-apiculatis, senectute pallide stramineis; pappi radii circa 4.5 mm. longi, tantum serrulati vel barbellati, nuces setis paucis distinctis munitae; stylo exserto.

The staminate plant similar, but heads smaller; involucral bracts ovate-lanceolate, obtuse, pale stramineous; pappus rays somewhat plumose-clavellate.

RICHARDSON MTS.: Eastern slope, west of Mackenzie River Delta, 68° N., 136° W., 4000′ elev., barren gravel ridges near summit, July 7–10, 1933, *A. E. Porsild 6727* (TYPE); same place, snow-flushes at 2500′ elev., Aug. 16, 17, 1933, *6862, 6864.*

Perhaps most closely related to *A. alaskana* Malte, which differs from it by its smaller heads and the very characteristic purplish petioles. *Antennaria neoalaskana* superficially resembles *A. subcanescens* Ostenf., but the shape of the leaves is quite distinct and they also lack the dense, pannose tomentum of that species.

Antennaria nitida Greene, Pitt. **3**: 283. 1898; Fern. in Rhodora **24**: 101. 1926; Raup in Jour. Arn. Arb. **17**: 305. 1936.

MACKENZIE RIVER: Bear Rock, 1300′ elev., *3398;* GREAT BEAR LAKE: McTavish Arm, east shore, *3739;* north shore, *3686;* south shore, *3660, 3649.*

All specimens collected were of the pistillate plant. New to the flora of the Northwest Territories.

Antennaria parvifolia Nutt. in Trans. Am. Phil. Soc. new ser. **7**: 406. 1841.

GREAT BEAR LAKE: McTavish Arm, south shore, *3641;* north shore, *5320;* east shore, *3738, 3738A.*

A remarkably uniform series from pre-Cambrian rocks of the east end of the lake is with some doubt referred to this species. Our plants have subligneous rootstocks, rather short innovations, and form small, rather dense mats. The basal leaves are short, less than 1 cm. long, spatulate, somewhat cuneate, densely adpressed-tomentose on both surfaces but not at all shiny as in *A. nitida.* The cauline leaves are well-developed, 1 to 2 cm. long, and are without scarious appendages. The heads, 3 to 5 in number, are sessile in an almost globular inflorescence, the outer bracts are lanate below, brown or stramineous, the inner ones obtuse, stiff and papery, white with a tinge of yellow. The style is barely exserted, and the achenes are glabrous and epapillose. Our plants were all pistillate.

Antennaria pulcherrima (Hook.) Greene, Pitt. **3**: 176. 1897.

Antennaria carpathica var. *pulcherrima* Hook. Fl. Bor.-Am. **1**: 329. 1834, and var. *humilis* Hook. ibid.; Malte in Rhodora **36**: 105. 1934, excl. *A. lanata;* Ostenf. in Gjöa Exp. 67. 1910.

Antennaria cucosma Fern. in Rhodora **13**: 23. 1911.

GREAT BEAR LAKE: Bear River, *3274;* south shore, Leith Pt., *3559, 3598;* north shore of Dease Arm, *4724;* north shore of McTavish Arm, *5188.*

Ostenfeld, l. c., from a fragment collected on the Arctic Coast west of the Mackenzie Delta, was the first to record this species in the Arctic. The record perhaps needs confirmation, in as much as we failed to collect this rather conspicuous species on the Arctic Coast, in the Mackenzie Delta, or in the mountains west of the Delta.

Antennaria pulcherrima appears to be restricted to calcareous soils and for this reason its distribution is not continuous, although it is now known to occur across the continent from the Gulf of St. Lawrence to Alaska, north to Hudson Bay and Great Bear Lake.

Notwithstanding Malte's remarks, l. c., *A. lanata* is really amply distinct from *A. pulcherrima* by its much reduced, conspicuously scarious-tipped cauline leaves, much lower stature, and much more lanate-tomentose leaves and stem. Also, *A. lanata* is a more southern species with a rather well-defined geographic range. In the large material now available in the National Herbarium of Canada, from mountains of Alberta and British Columbia, there is not a single sheet that in any way may be said to approach *A. pulcherrima.*

Antennaria pygmaea Fern. in Rhodora **16**: 129. 1914; ibid. **26**: 99, *tab. 142, figs. 5 & 5a.* 1924; Polunin, Bot. Can. E. Arct. 353. 1940.

MACKENZIE RIVER DELTA: Richards Isl., *2286, 2287;* GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3515;* KEEWATIN DISTR.: Yathkyed Lake on Kazan R., *5852.*

As correctly pointed out by Polunin, l. c., *A. pygmaea* is not always monocephalous and may even have two smaller heads below the central one (Pt. Burwell, *A. E. Porsild 5986*). In the writer's no. *5852* some plants have two heads of equal size side by side. In the interior of the continent *A. pygmaea* becomes much taller than in Labrador, and specimens 10–14 cm. high are not uncommon. In all specimens examined the mature achenes are glabrous, the pappus is pure white with a silky sheen, and the styles are barely exserted.

Antennaria rupicola Fern. in Rhodora **1**: 74. 1899.

GREAT BEAR LAKE: Southern part of McTavish Bay, *3648, 3640;* east shore, *3738A;* Etacho Pt., alpine meadows, 1500′ elev., *3517.*

This species, originally described from Maine, has since been collected in a number of places about the Gulf of St. Lawrence and in Newfoundland, and lately also from Lake Superior, Thunder Cape, Michigan. Abundant material of a plant first thought to be undescribed was collected in several places on Great Bear Lake. Although closely related to such western species as *A. acuminata* Greene, *A. pedicellata* Greene, or *A. Howellii* Greene, it seems, nevertheless, best placed with *A. rupicola* Fern., as do some other specimens in the National Herbarium of Canada from Yukon and from northern British Columbia.

Although Fernald, ibid. **16**: 132. 1914, reduced his species to a variety of *A. neodioica* Greene, the western plant at least is very distinct from that species. Characteristic for our plant are the strongly developed cauline leaves which are entirely without scarious tips. The achenes are dark brown and distinctly papillose.

Antennaria subcanescens Malte in Rhodora **36**: 112. 1934; Porsild in Rhodora **41**: 295. 1939.

ARCTIC COAST: Cape Dalhousie, *2800.*

Achillea sibirica Ledeb.

MACKENZIE RIVER DELTA: Portage between Campbell and Setidgi Lakes, *2028.*

Matricaria ambigua (Ledeb.) Kryl. Fl. Alt. **3**: 625. 1904. For complete synonymy see M. P. Porsild in Medd. om Grønl. **92**[1]: 72. 1932.

A common species along the Arctic Coast and thus far not collected in the interior of our district.

Chrysanthemum arcticum L.

Common along the Arctic Coast and, like the preceding, apparently a littoral species absent in the interior.

Tanacetum bipinnatum (L.) Schultz-Bip.

MACKENZIE RIVER DELTA: East Branch, *7007.*

Artemisia arctica Less.

Artemisia comata Rydb. in N. Am. Flora **34**: 263. 1916.

RICHARDSON MTS.: West of Mackenzie Delta, 1500′–2500′ elev., *6726, 6869, 6870, 7350;* ARCTIC COAST OF YUKON TERRITORY: Shingle Pt., *6911;* King Pt., *7199.*

This is perhaps the most common *Artemisia* west of the Mackenzie, on the Arctic Coast and in the mountains. It grows in moist, grassy places, on snow-flushes, and in thickets. Toward maturity the peduncles of the fruiting heads are sharply deflexed.

Hooker's record from Bear Lake, no doubt, refers to *A. hyperborea* Rydb. *Artemisia comata* Rydb. is merely the extreme arctic, depressed form of *A. arctica* Less. The specimens collected by the Canadian Arctic Expedition, including the Rydberg type from the north shore of Alaska, are all very poor, and, obviously, were collected under snow.

Artemisia biennis Willd.

MACKENZIE RIVER: Ramparts above Good Hope, *3404.*

Artemisia frigida Willd.

MACKENZIE RIVER DELTA: Campbell Lake, *2017;* East Branch, *6531;* Richards Isl., *2122;* ARCTIC COAST: Liverpool Bay, Kugaruk, W. of Anderson R., *3089.*

On sandy slopes on the East Branch of the Mackenzie Delta *A. frigida* is one of the dominant species. When fresh, the plant is strongly aromatic and, during the hot weather, colonies of *A. frigida* along the East Branch can be detected by their fragrance at a distance of several miles.

Artemisia hyperborea Rydb. in N. Am. Flora **34**: 262. 1916.

MACKENZIE RIVER DELTA: East Branch, *7052, 7278;* GREAT BEAR LAKE: Smith Arm, north shore, *5018;* Cape McDonnel, *5164.*

This species, like *A. frigida,* when fresh, is strongly aromatic. It grows in dry sandy or gravelly places.

Artemisia Richardsoniana Bess. in Bull. Soc. Nat. Mosc. **9**: 64. 1836. See Rydb. in N. Am. Flora **34**: 261. 1916.

ARCTIC COAST: Cape Dalhousie, *2807.* Our specimens are larger but otherwise match what is probably a duplicate of the type, labelled by Hooker "A. arctica—*Dr. Richardson*" (Can).

This rare plant, which has been collected but a few times on the Arctic Coast, differs strikingly from *A. hyperborea* in its dense investment of white wool 0.5 cm. long. The flowering stems are reddish and the inflorescence compact. Rydberg's record, l. c., from "Northern Alberta" probably needs confirmation.

Artemisia spithamaea Pursh.

GREAT BEAR LAKE: McTavish Bay, *3685.*

Petasites arcticus sp. nov.

Herba perennis, rhizomate crasso horizontali instructa; folia cum floribus contemporanea, palmatim venosa, lobata, reniformia, evoluta 15–30 cm. lata, 10–15 cm. longa, marginibus molliter ciliata caeterum et tenella utrinque glabra, laete pallide viridia, lamina vix ultra medium in lobis 5–8 cuneatis mucronatodentatis partita, petiolis obscure purpurascentibus quam lamina circa duplo longioribus; caulis 50–70 cm. longus, parcius floccoso-tomentosus, bracteis scariosis paucis instructus; inflorescentia corymbosa, pedunculis fructigeris 5–10 cm. longis; involucrum plantae foemineae 1 cm. longum, bracteis basi tomento tenui brunneo indutis; stigma bilobum, nuculae lineares, glabrae; pappus sericeus albido-flavus.

MACKENZIE RIVER DELTA: East Branch, 68° 40′ N., in wet clay of shady ravines, with almost mature fruit on June 26, 1932, *A. E. Porsild 6515* (TYPE). Additional collections are: RICHARDSON MTS.: West of Delta, shaly scree, 1500′ elev., *7349;* MACKENZIE RIVER DELTA: East Branch, *6952;* ARCTIC COAST OF YUKON TERRITORY: Between King & Kay Pts., *7208;* ESKIMO LAKE BASIN: Kugaruk, west of Anderson R., *3058.*

Petasites arcticus is a common species on wet, shaly, or clayey slopes, where it flowers and fruits very early in the season. It is perhaps most closely related to *P. speciosus* (Nutt.) Piper, from which it differs in its perfectly glabrous leaves, which also lack the flat bristles on the upper surface of the leaf so characteristic of that species.

Petasites frigidus (L.) Fries, Macoun & Holm, Rept. Can. Arct. Exp. **5A**: 22. 1921.

To the synonymy given by Rydb., in N. Am. Flora **34**: 312. 1927, should be added:

Petasites gracilis Britt. in Bull. N. Y. Bot. Gard. **2**: 186. 1901.

Petasites frigida (L.) Fries var. *corymbosa* (R. Br.) Herder, Pl. Radd. Monopet. 3^2: 4. 1867.

Nardosmia sagittata sensu Hook. Fl. Bor.-Am. **1**: 307. 1834, non Pursh, at least in part.

ARCTIC COAST OF YUKON TERRITORY: Shingle Pt., *7115;* RICHARDSON MTS.: *6629;* MACKENZIE RIVER DELTA: East Branch, *6961;* Campbell Lake, *1971;* Richards Isl., *2284, 2285;* Kittigazuit Isl., *2405;* ARCTIC COAST: Atkinson Pt., *2669;* Liverpool Bay, *2937;* GREAT BEAR LAKE: Ft. Franklin, *3225;* north shore, Haldane R., *4947.*

A western arctic-alpine species in America, common from the Bering Sea region north and east along the Arctic Coast to Coronation Gulf and the western Arctic Archipelago to Melville Island, south to Great Bear Lake and in high mountains of Alaska, Yukon, Alberta, and British Columbia south to lat. 54°.

Petasites hyperboreus Rydb. in N. Am. Flora **34**: 312. 1927.

This apparently is an alpine plant endemic to mountains of Alberta, British Columbia, and possibly Washington. The writer strongly suspects that this species is identical with *P. nivalis* Greene, Pitt. **2**: 18. 1889. Rydberg is certainly wrong when, l. c., he gives *Nardosmia corymbosa* Hook., Fl. Bor.-Am. **1**: 307. 1834, as a synonym, even though he qualifies the statement by adding "mainly." Although Hooker, l. c., obviously misunderstood that genus, there can be no doubt that by *N. corymbosa* he referred to the arctic plant. Thus, from the distribution given by Rydberg, l. c., from *P. hyperboreus* should be excluded: "Arctic Coast from Hudson Bay to Alaska."

Petasites sagittatus (Banks) Gray. To the synonymy given by Rydb., in N. Am. Flora **34**: 311. 1927, should be added:

Nardosmia frigida sensu Hook. Fl. Bor.-Am. **1**: 307. 1834, non L., at least in part.

MACKENZIE RIVER DELTA: East Branch, *7297;* Aklavik, *7314;* GREAT BEAR LAKE: Dease Arm, north shore, *4904;* MACKENZIE DISTR.: Thelon R., lat. 63°–64° N., *Tyrrell 23184, 14691* (Can); Thelon R., mouth of Hanbury R., *Radford 132367* (Can).

It seems abundantly clear that Hooker, l. c., either misunderstood the genus or else his notes somehow had become mixed. Thus *Nardosmia frigida* is described: "foliis cordatis inaequaliter dentatis subtus tomentosis," but in the discussion he states: "From Lake Winnipeg, in lat. 52°, to Ft. Franklin, in lat. 66°, *Dr. Richardson*—Very few of the specimens gathered have leaves exactly answering to the above character, and of these, some are nearly ten inches long, independent of the petiole." This clearly shows that Hooker, at least in this instance, spoke of *P. sagittatus,* which is the largest-leaved and least northern of the non-palmately veined species of *Petasites.* This is amply born out by a photograph in the Gray Herbarium, made by Professor M. L. Fernald in 1903 from Hooker's Herbarium in the British Museum, showing a sheet of typical *P. sagittatus.* It is labelled: "*Nardosmia frigida* Hook. L. Winnipeg R." Another photograph shows a sheet which is labelled at the bottom: "*Nardosmia sagittata,* Hook. Fl. Bor.-Am. 307 in part, not *T. sagittata* Pursh." On the sheet are two collections, both labelled *Nardosmia sagittata* Hook. The first is from "Cape Bathurst on the Arctic Coast," the second is labelled "Between Y. H. & Cd. H. Spa. 1825, R." Both collections show plants of typical *P. frigidus* in various stages of leaf-denticulation. Finally, a third photograph shows a small specimen of *P. sagittatus.* It was originally labelled: "Tussilago palmata, Okak in Labrador leg. Weitz"; an additional notation on the back of the sheet reads: "America Septentrionalis, Labrador, 1785, Soc. unit. fratr." The label bears a subsequent correction which reads: "T. frigida."

Petasites sagittatus is apparently an eastern species distributed from Labrador west to the Mackenzie and Yukon Territory.

Arnica alpina (L.) Olin ssp. **angustifolia** (J. Vahl) Maguire in Madroño **6**: 153. 1942.

For his monograph of the genus, Dr. Bassett Maguire has kindly named the Arnicas in the writer's collection. While the writer would prefer to assign specific rank to ssps. *attenuata* and *tomentosa,* he is following Dr. Maguire's interpretation.

RICHARDSON MTS.: West of Mackenzie Delta, 1500′ to 2500′ or occasionally 4000′ elev., *6865;* MACKENZIE RIVER DELTA: East Branch, *6516;* Campbell Lake, *1972, 1973;* Richards Isl., *2280;* ARCTIC COAST: 6 mi. east of Kittigazuit, *2529, 2530;* Tuktuayaktoq, *7447* (the last four numbers, according to Maguire, approach ssp. *attenuata*); Liverpool Bay, *2947;* GREAT BEAR LAKE: Dease Arm, Narakay Isl., *4856;* Bear River, *3248* (last two approaching ssp. *attenuata*); Etacho Pt., 1500′ elev., *3518;* Dease Arm, Dease Valley, *4882* (approaching ssp. *Sornborgeri*); Dease Arm, north shore, *4728.*

A widely distributed arctic subspecies, common in North America on sandy and gravelly slopes, from Greenland west at least to the Mackenzie, south to the limit of trees.

Arnica alpina (L.) Olin ssp. **attenuata** (Greene) Maguire in Madroño **6:** 153. 1942.

RICHARDSON MTS.: West of Mackenzie Delta, in thickets on the lower slopes, *7348* (approaching ssp. *angustifolia*); MACKENZIE RIVER DELTA: East Branch, *7004;* KEEWATIN DISTR.: Lake on Tha-anne River, *5602* (approaching ssp. *Sornborgeri*).

A western subspecies, perhaps less common and decidedly more southern in its distribution than ssp. *angustifolia.*

Arnica alpina (L.) Olin ssp. **tomentosa** (J. M. Macoun) Maguire in Madroño **6:** 153. 1942.

RICHARDSON MTS.: West of Mackenzie Delta, alpine slopes, 4000′ elev., *6728* (× *A. louiseana* ssp. *frigida*); ARCTIC COAST: Atkinson Pt., *2670;* GREAT BEAR LAKE: Cape McDonnel, *5162A.*

New to the flora of the Northwest Territories.

Arnica Lessingii Greene, Pitt. **4:** 167. 1900.

RICHARDSON MTS.: West of Mackenzie Delta, alpine slopes between 1500′ and 2500′ elev., *6866.*

New to the flora of the Northwest Territories.

Arnica louiseana Farr. ssp. **frigida** (Meyer) Maguire in Madroño **6:** 153. 1942.

RICHARDSON MTS.: West of Mackenzie Delta, grassy slopes, 1500′ elev., *6867;* MACKENZIE RIVER DELTA: Richards Isl., *7080;* East Branch, *6968;* GREAT BEAR LAKE: Cape McDonnel, *5162.*

New to the flora of the Northwest Territories.

Senecio atropurpureus (Ledeb.) Fedtsch. See Porsild in Rhodora **41:** 298. 1939.

RICHARDSON MTS.: West of Mackenzie Delta, alpine slopes betweeen 1500′ and 3000′ elev., *6724, 6725, 6875, 6876;* ARCTIC COAST OF YUKON TERRITORY: Between King and Kay Pts., *7165, 7166, 7203, 7205.*

The specimens in the above series are somewhat variable; thus on barren hill tops and in gravelly places the entire plant becomes tomentose, with reduced stem leaves and few heads, while in moist grassy places it is glabrate or sparingly arachnoid with from 2 to 5 heads. In life the rays are dark croceous, but in drying they fade and become much paler. The mature achenes are sparingly strigose-hirsute.

A western species in America. Near the Arctic Coast it reaches the west bank of the Mackenzie.

Senecio hyperborealis Greenm. in Ann. Mo. Bot. Gard. **3:** 98. 1916.

MACKENZIE RIVER DELTA: Campbell Lake, *1967–1969;* East Branch, *6518, 7055;* ARCTIC COAST: Liverpool Bay, *2941, 2942;* GREAT BEAR LAKE: Bear R., Mt. Charles, *3305.*

This pretty little *Senecio* grows on calcareous rocks and flowers from the middle of June throughout the summer. It appears to be an endemic of the Yukon Territory and northwestern Mackenzie.

Senecio Kjellmanii A. E. Porsild. See Rhodora **41:** 299. 1939.

RICHARDSON MTS.: West of Mackenzie Delta, 3000′ elev., *6722.*

Senecio pauperculus Michx.

GREAT BEAR LAKE: South shore, Leith Pt., *3557, 3597.*

Senecio resedifolius Less.

RICHARDSON MTS.: West of Mackenzie Delta, 3000′ elev., *6723.*

Saussurea angustifolia DC.

RICHARDSON MTS.: West of Mackenzie Delta, *6877;* MACKENZIE RIVER DELTA: East Branch, *6554, 6715;* Richards Isl., *2131, 2293, 7452;* Kittigazuit Isl., *2406;* ESKIMO LAKE BASIN: *3016;* Setidgi Lake, *3171, 3172;* GREAT BEAR LAKE: Dease Arm, Dease Valley, *4881;* KEEWATIN DISTR.: Yathkyed L., on Kazan R., *5859.*

The above series shows a great deal of variation from glabrous to lanulose and from narrow, entire to lanceolate, repand-dentate leaves. Some are low with a few heads in open, long-pedunculate corymbs, others are from 8 to 50 cm. high. Since they are all alike in floral characters, the writer thinks it inadvisable to separate the material on vegetative characters alone.

A western arctic species, in America reaching east to central Keewatin.

Taraxacum

The large series of *Taraxacum* collected in Alaska in 1926 and in the Mackenzie District in 1927–1928 were sent to the late Dr. Dahlstedt in 1930, but upon his death they were returned unnamed. In 1936, the collection, with additional material collected in the Keewatin District in 1930 and in the Mackenzie in 1932–1935, was sent to Dr. Haglund. When returned two years ago, annotations showed that in the collection Dr. Haglund had detected 5 or 6 undescribed species. As far as the writer is aware, none of them has yet been published.

Taraxacum alaskanum Rydb.

RICHARDSON MTS.: West of Mackenzie Delta, 1000′–4000′ elev., *6878, 7347;* MACKENZIE RIVER DELTA: East Branch, *6557;* Richards Isl., *2295.*

A very pretty little species, apparently endemic to Alaska and Yukon, and reaching east to the Mackenzie or slightly beyond.

Taraxacum Carthamopsis M. P. Porsild in Trans. Roy. Soc. Can. 3 ser. **33**: 29, *tab. 1–3.* 1939.

MACKENZIE RIVER DELTA: East Branch, sandy river banks, *7279.*

Thus far known only from the type locality.

Taraxacum lacerum Greene.

GREAT BEAR LAKE: Dease Arm, Narakay Isl., *4857;* McTavish Arm, north shore, *5322.*

Taraxacum phymatocarpum Dahlst.

ARCTIC COAST: Cape Dalhousie, *2812;* Liverpool Bay, *2951.*

Rare or occasional on the Arctic Coast and Islands.

Agoseris ? cuspidata (Pursh) Steud.

MACKENZIE RIVER DELTA: East Branch, between 68° 30′ and 68° 55′ N., *6741, 6885, 6896, 7051.*

Our plant has narrow, linear-lanceolate leaves, 0.8 cm. wide and 20–25 cm. long, shorter than the scape, pubescent and conspicuously ciliate, purple at the base; scape lanulose below the head; bracts broad, cuspidate with dark purplish center, densely and coarsely lanulose. The ligules are yellow, fading toward the tip. Achenes cylindrical, beakless, prominently ribbed. Our plant flowered in the last week of July and produced abundant fruit. It is rare or occasional on sandy slopes along the East Branch and was seen nowhere else.

Crepis elegans Hook.

GREAT BEAR LAKE: Bear R., *3249, 3373.*

Crepis nana Richards.

RICHARDSON MTS.: West of Mackenzie Delta, *6627.*

Hieracium gracile Hook.

GREAT BEAR LAKE: Etacho Pt., 1500′ elev., *3524.*

New to the flora of the Northwest Territories.

Hieracium canadense Michx.

GREAT BEAR LAKE: Bear R., Mt. Charles, *3345;* McTavish Arm, *3658.*

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THE WILLOWS OF THE HUDSON BAY REGION AND THE LABRADOR PENINSULA

HUGH M. RAUP

with four plates

INTRODUCTION

THE following paper, on the willows of the Hudson Bay region and the Labrador Peninsula, has grown out of efforts to determine collections from that area. In the summer of 1939 Dr. and Mrs. Ernst C. Abbe and Mr. John Marr, of the University of Minnesota, made a journey to Richmond Gulf on the eastern coast of Hudson Bay for the purpose of making general botanical collections.[1] Later, in working up his material, Dr. Abbe obtained a quantity of undetermined or partially determined material from the Hudson Bay region collected by others over a period of many years. Most of this came from the Herbarium of the Carnegie Museum of Pittsburgh and was collected by various people who have gone to Labrador and Hudson Bay from that museum on ornithological and mammalogical collecting expeditions. Most of the botanical specimens were gathered by Mr. W. E. Clyde Todd, Dr. George M. Sutton,[2] and by Mr. and Mrs. J. K. Doutt.[3] In addition to the Carnegie Museum material Dr. Abbe also obtained some Labrador collections from the University of Minnesota, mostly collected by Margaret E. Oldenburg, who made a trip around the Labrador coast in 1939.

The willows from these assembled collections, totalling 284 numbers, were turned over to me for determination. With the exception of one collection from Southampton Island, scarcely any records for them have previously appeared in the literature, and they constitute most of the new material on geographic distribution to be found in the present paper. The exception mentioned above is that of the collection of Dr. George M. Sutton in 1929–30, of which I published a list in 1936.[4] This collection was restudied later by Dr. Nicholas Polunin and cited in his "Botany of the Canadian Eastern Arctic."[5]

In working up this material and preparing the list I have had access to the collections of the Gray Herbarium, the Arnold Arboretum, and the National Herbarium of Canada. I have also seen much of the pertinent material at the herbarium of the New York Botanical Garden, particularly of those species which are of critical nature. In all I have seen about 1300 collection numbers, involving approximately 1700 specimens.

[1] Abbe, E. C. The expedition to Hudson Bay of the University of Minnesota. Science **90:** 458–459 (1939).

[2] See Mem. Carn. Mus. **12.**

[3] See Todd, W. E. C. More about Labrador. An account of a trip to the Grand Falls of the Hamilton River. Carnegie Mag. **13:** Sept. (1939). Also, Ann. Rept. Carn. Mus. Pittsburgh **1938:** 14–15 (1939).

[4] Raup, H. M. Pteridophyta and Spermatophyta of Southampton Island. Mem. Carn. Mus. **12**[3]**:** 17–30 (1936).

[5] Polunin, Nicholas. Botany of the Canadian Eastern Arctic, I. Pteridophyta and Spermatophyta. Nat. Mus. Can. Bull. **92:** Salix, 151–173 (1940). See also Polunin, N. Flora of Southampton Island, Hudson Bay. Jour. Bot. **76:** 93–103 (1938).

The area involved covers the shores of Hudson and James Bays and the Labrador Peninsula. Westward in the District of Keewatin it includes the basins of the Kazan River and Baker Lake and the basin of the Dubawnt River up as far as Dubawnt Lake. In northern Manitoba and Ontario it extends westward approximately to long. 96° W. and southward to about lat. 51°. In the north it includes Southampton Island and smaller islands of the northern part of Hudson Bay, as well as the islands in Hudson Strait (in the District of Franklin). Southeastward I have included all of the Labrador coast south to the Straits of Belle Isle, and the north shore of the Gulf of St. Lawrence westward to Seven Islands. The islands off the north shore of the Gulf, including Anticosti, have also been covered, as well as that part of Newfoundland which adjoins the Straits of Belle Isle.

It will be noted that this area adjoins or overlaps the areas of the following comprehensive lists recently published: at the north, Polunin's "Botany of the Canadian Eastern Arctic"; at the southwest, Rydberg's "Flora of the Prairies and Plains";[6] and at the southeast, Marie-Victorin's "Flore Laurentienne."[7] Polunin's area extends south to lat. 60° and west to long. 95°, thus forming the largest overlap with the present paper. All of the willows listed by Polunin for the eastern Arctic, except for a minor form described from southern Baffin, are to be found in the area treated here. Rydberg's Flora reaches northward, technically, only to southern Manitoba in this longitude, but so many of the willows listed in it are of wide range in the Canadian forests that it serves very well for much of the country in the whole basin of Lake Winnipeg. Victorin's flora covers southern Quebec northeastward only to Lake St. John and the Saguenay River. Eastern Keewatin will be more thoroughly treated when A. E. Porsild's studies of the western arctic Canadian flora are published and his specimens distributed. This work is now in progress.

The present paper contains very little in the way of taxonomic innovation, and no new species, varieties or forms. In general organization it rests very largely upon the monographic studies of American willows made by Dr. Camillo Schneider. Its main reason for being is that it records for the first time in one place a large mass of new fact about the willows of this region. The immediate results have been the clarification of some of the more poorly known species and a greatly increased knowledge of the geographic aspects of the genus as a whole in northeastern America. It is hoped that these results, together with the diagnostic keys, will facilitate further collection and study of the group. The accumulation of large amounts of new specimen material, however, is not an unmixed advantage; for while some of the lesser-known entities are clarified, many of the "well-known" ones begin to fray at the edges and to show distressingly close relationships with other "well-known" species. This seems to be particularly the case with the genus *Salix,* although whether it is due, as some students appear to think, to promiscuous hybridity, or to some other form of cytological perversity, is yet to be fathomed.

I shall make no attempt to give a complete history of willow-collecting in the region covered. In the middle of the last century the great Swedish monographer, N. J. Andersson, had only a few scattered specimens from the southern Labrador coast and a few from the arctic and Hudson Bay coasts. The first

[6] Rydberg, P. A. Flora of the prairies and plains of central North America. Publ. by the N. Y. Bot. Gard. (1932).

[7] Victorin, Fr. Marie-. Flore Laurentienne. Montreal (1935).

modern collections of consequence were those of the Canadian botanists and geologists John Macoun, James M. Macoun, William Spreadborough, Robert Bell, and A. P. Low. The knowledge of eastern arctic and subarctic willows accumulated by M. S. Bebb in the 1880's and '90's, and by Rydberg in 1899, rested largely upon these Canadian collections. They were of necessity scattered and incomplete. Spreadborough and J. M. Macoun made trips with geological survey parties to James Bay and the southwestern coasts of Hudson Bay, partly by boat, partly overland to the southern tip of James Bay and northeastward from Lake Winnipeg. James M. Macoun did not make his collecting trip along the northwest coasts of Hudson Bay until later, in 1910.[8] The coasts of the Labrador Peninsula were surveyed by Bell and Low and their associates in the 1880's and 1890's, for the Canadian Geological Survey. Both these men were remarkably well-trained naturalists, and I have seen nearly 50 numbers of willows collected by them alone. On Low's trip from Richmond Gulf to Ungava Bay in 1896 he took along Spreadborough, who made substantial botanical collections from a vast inland region not since visited by a botanist.

Dr. Camillo Schneider, a German student of willows, came to America in 1917 and was interned at Boston for the duration of the first World War. He was quartered at the Arnold Arboretum and undertook monographic studies of American *Salix*, which he finally finished in 1921, after his return to Germany. While at the Arboretum he borrowed large quantities of material from the principal herbaria of America, making careful dissections and sketches of hundreds of specimens. At the same time, although greatly handicapped due to the inaccessibility of types, he made remarkable progress toward the solution of many problems of nomenclature. Schneider brought to bear, in these studies, an extraordinary knowledge of the genus as a whole. Just before beginning the American work he had finished a synopsis of the genus in eastern Asia and the Himalayas for "Plantae Wilsonianae."[9] In America he was able to see representative material from nearly all parts of the continent from which specimens were then available. His delineation of American species, although far from ideal in many instances, is in the main realistic and workable; and his comprehensive keys are the best that have been published to date. Unfortunately, his results were printed serially[10] in such a way that they have reached relatively few students, and under a reprint policy that has made it almost impossible to gather the whole series into a single book. The first few volumes of the Journal of the Arnold Arboretum have long since been out of print, so that Schneider's keys, index, and much of his discussion are entirely unobtainable. Furthermore, the keys are all in Latin, of which translations have never been published, so that students and collectors who do not use Latin readily are handicapped at the outset.

With regard to our region, however, Schneider was not much better supplied with material in 1918 than were Bebb and Rydberg in the '90's. Of the 1300

[8] Macoun, J. M. Flora and fauna of the west coast of Hudson Bay. Geol. Surv. Can. Summ. Rept. **1910:** 281–283 (1911).

[9] Schneider, C. Salicaceae, in Sargent, Plantae Wilsonianae **3:** 16–179 (1916), Publ. Arn. Arb. 4.

[10] Schneider, C. A conspectus of Mexican, West Indian, Central and South American species and varieties of Salix. Bot. Gaz. **65:** 1–41 (1918); Notes on American willows, I. Bot. Gaz. **66:** 117–142 (1918), II. ibid., **66:** 318–353 (1918), III. ibid., **67:** 27–64 (1919), IV. ibid., **67:** 309–346 (1919), V. Jour. Arn. Arb. **1:** 1–32 (1919), VI. ibid., **1:** 67–97 (1919), VII. ibid., **1:** 147–171 (1920), VIII. ibid., **1:** 211–232 (1920), IX. ibid., **2:** 1–25 (1920), X. ibid., **2:** 65–90 (1920), XI. ibid., **2:** 185–204 (1921), XII. ibid., **3:** 61–125 (1921).

numbers that I have seen, only 234 were available to Schneider in 1917–18, and probably not more than 50 of these were new after Rydberg's study in 1899. In short, during the past 25 years, since Schneider's monographic work, the willow collections from our region have been increased more than five-fold. To the greater numbers of specimens, moreover, must be added the fact that far more highly trained and experienced collectors have visited the region in these recent years than in all the preceding period. To mention only a few, there were M. O. Malte, E. C. Abbe, R. H. Woodworth, M. L. Fernald (Nfld.), Nicholas Polunin, Victorin & Rolland, H. F. Lewis, and Harold St. John. During the past 25 years, also, several new species and varieties have been described, chiefly by Professor Fernald, who has done much to straighten out some of the worst taxonomic tangles with which we have to deal. It has been necessary to re-examine these recently described plants and insert references to them in the keys.

Neither in the arrangement of the list nor in the keys have I indicated sectional subdivisions of the genus. With our present understanding of relationship, present and past, among the species, it is somewhat hazardous to do so. True, some of the species fall readily and reasonably into groups that can be regarded as sections, but intermediates can be recognized between so many of these supposedly well-established sections that their boundaries in many cases cease to be useful. Furthermore, the continued description of new forms not only increases the number of these intermediates, but also continues to bring out species that will not go into any of the known sections.

For what it may be worth, the following is a tentative disposition of the species of our region in the recognized sections of the genus.

PENTANDRAE: *serissima, lucida.*
LONGIFOLIAE: *interior.*
RETICULATAE: *reticulata, vestita, jejuna.*
HERBACEAE: *Uva-ursi, herbacea.*
OVALIFOLIAE: *arctica, arctophila, hudsonensis.*
GLAUCAE: *glauca, cordifolia, brachycarpa, fullertonensis.*
CORDATAE: *cordata, lutea, myrtillifolia, glaucophylloides, adenophylla.*
BALSAMIFERAE: *pyrifolia.*
CHRYSANTHEAE: *Richardsonii, calcicola, Wiegandii, alaxensis, laurentiana.*
CANDIDAE: *candida, cryptodonta.*
FULVAE: *Bebbiana.*
ROSEAE: *pedicellaris, simulans.*
GRISEAE: *humilis.*
DISCOLORES: *discolor.*
PHYLICIFOLIAE: *planifolia, paraleuca, pedunculata, amoena, pellita.*
Sect. INCERTAE: *arbusculoides, argyrocarpa.*

Some of the uncertainties of this arrangement are shown by *S. simulans,* which combines the leaves of the *Roseae* with the pistillate aments of the *Glaucae;* by *S. jejuna,* which has characters of both the *Reticulatae* and the *Ovalifoliae;* by *S. amoena,* which has a general resemblance to the *Phylicifoliae,* but with floral bracts like those of the *Glaucae.* As pointed out by Schneider, *S. arbusculoides* and *S. argyrocarpa* are more or less unique and do not fit into any known sections.

The maps [11] are based principally upon specimens cited in this paper, although in some cases published records have been used if they could be reasonably well authenticated. Very few such records have been used for the more variable and

[11] The base map used is by J. Paul Goode, published by the University of Chicago Press.

controversial species groups. I have tried to make the maps as complete as possible for the whole area of each. For regions outside that treated in the present paper I have used, in addition to specimens at the Harvard herbaria, chiefly Polunin's "Botany of the Canadian Eastern Arctic," Grøntved's paper on collections from the 5th Thule Expedition,[12] and papers by M. P. Porsild [13] and T. W. Böcher [14] on the Greenland flora.

A detailed discussion of problems in the geographic distribution of northeastern American willows is beyond the scope of the present paper. Nevertheless, a number of outstanding geographic facts are evident even from a cursory examination of the maps, and may be stated briefly.

Sixteen of the species listed are distinctly southern in their distribution within our region, reaching northward only to the north shore of the Gulf of St. Lawrence or at most to the southern parts of James and Hudson Bays or the Hamilton River district. Some of these are of wide western range in the Canadian forest: *interior, brachycarpa* and var. *antimima, pyrifolia, myrtillifolia, pedicellaris* var. *hypoglauca, Bebbiana, candida.* Others are eastern in the Canadian forest or range far southward in the Alleghanian region: *serissima, lucida, cordata, glaucophylloides, adenophylla, humilis, discolor, pellita. Salix lutea* probably should be in this category, although it apparently comes into our region from the northern Great Plains, where it has a large development. Some of the more distinctly eastern forms have close relatives, or vicariads, in western America. The eastern *serissima* and *lucida* are replaced in the west by *lasiandra; cordata* by *mackenziana, pseudocordata,* and their relatives; *discolor* by *Scouleriana; pellita* by *subcoerulea; Bebbiana* by *Geyeriana.*

At the other extreme, in the north, is a group of arctic species, some of which come south only to the Straits of Belle Isle or Newfoundland while others, such as *herbacea* and *Uva-ursi,* reach the mountains of New England. Only one of these is of wide range in arctic America: *reticulata;* the others are prevailingly eastern: *arctophila, arctica* vars. *Brownei* and *kophophylla, herbacea, Uva-ursi, argyrocarpa, vestita* (typical), *cordifolia* and vars., *calcicola.* As in the case of the southern species, some of these have western counterparts, *arctica* vars. *Brownei* and *kophophylla* being replaced in the west by other forms of *arctica,* typical *vestita* by its var. *erecta, cordifolia* by *glauca* and its variations, and *calcicola* by *Richardsonii.* Some of the western vicariads reach eastward to Hudson Bay and overlap their eastern relatives in that region, i.e., *glauca, Richardsonii,* and *vestita* var. *erecta.* Another willow which is widespread in the eastern arctic is *S. planifolia,* which, however, extends far west in the northern Canadian forest to the Rocky and Mackenzie Mountains. It is finally replaced in Mackenzie, Yukon, and Alaska by *S. pulchra,* and farther south in the mountains by its var. *monica.*

In the northwestern and western parts of our area there appears a peculiar group of species, some of which seem to be endemic in central arctic America while others are of far western affinity. Of the latter, *Richardsonii* and *glauca* have already been mentioned, while *arbusculoides* and *alaxensis* var. *obovalifolia*

[12] Grøntved, Johs. Vascular plants from arctic North America collected by the Fifth Thule Expedition, 1921–24. Rept. 5th Thule Exped. **2**: 32–35, Copenhagen (1936).

[13] Porsild, M. P. Stray contributions to the flora of Greenland. VI–XII. Meddel. Grønl. **93**[3]: 60 (1935).

[14] Böcher, T. W. Biological distributional types in the flora of Greenland. Meddel. Grønl. **106**[2]: 1–339 (1938).

should be added. None of these have ever been collected on the Labrador coast or the north shore of the Gulf of St. Lawrence, although *Richardsonii* and *glauca* var. *acutifolia* have been found in southern Baffin, and the latter on the shores of Hudson Strait. Apparently endemic to this region and the central arctic coast are *fullertonensis, hudsonensis, calcicola* var. *Nicholsiana,* and *glauca* var. *stenolepis.* It may be that *alaxensis* var. *obovalifolia* should be in this small group of endemics. Ball, who described the variety, believes that it is peculiar to the country east of the northern Cordillera. It should be noted that all of the endemic group are rather poorly known and need more study before their taxonomic and geographic affinities can be properly worked out.

There remains to be mentioned a group of apparent endemics and isolated populations that center about the Gulf of St. Lawrence.[15] The endemics include *jejuna, Wiegandii, laurentiana, cryptodonta, simulans, paraleuca, pedunculata, amoena, vestita* var. *psilophylla, cordifolia* var. *eucycla, myrtillifolia* var. *brachypoda, pellita* f. *psila.* The presence of typical *S. brachycarpa* in Gaspé, Anticosti, and on Hudson Bay is a striking example of a Rocky Mountain species with isolated populations in the east.

It is of interest to consider, together, the group of arctic and subarctic species which are distinctly northeastern in America. In addition to the 12 endemics of the Gulf of St. Lawrence just noted, there are *Uva-ursi, argyrocarpa,* and *cordifolia* that have not been authentically recorded west of the east coast of Hudson Bay. Another small group has been collected on the west coast but not much farther west: *arctica* vars. *Brownei* and *kophophylla, herbacea, vestita* (typical), *calcicola.* To the above must be added the two endemics of the northern part of Hudson Bay and southern Baffin, *calcicola* var. *Nicholsiana* and *glauca* var. *stenolepis. Salix fullertonensis* and *hudsonensis* may have to be included here, but until their western ranges are better known they can hardly be considered with the eastern group.

One can hardly avoid an immediate division of these 22 eastern forms into two categories by the size of their areas. The endemics of the St. Lawrence and the Hudson Strait region are all highly localized, with areas relatively very small. All of the other species noted, on the other hand, are of wide range or are nearly ubiquitous. Another fact of interest is that the relationships of the Gulf of St. Lawrence endemics are not with the group of species that has a wide southern range in the Alleghanian region, but rather with arctic and Canadian forest species. *Salix jejuna* has its nearest relations with *reticulata; Wiegandii* and *laurentiana* probably belong in the section *Chrysantheae,* which contains *alaxensis, Richardsonii* and *calcicola; cryptodonta* was placed provisionally in the *Candidae* by Schneider; *paraleuca, pedunculata, amoena,* and *pellita* apparently belong in the *Phylicifoliae* with *planifolia, pulchra,* etc.

The keys are largely modifications of those already in use. The main key to the species follows Schneider's,[16] with the insertion of forms that have been described since he prepared it. Rather than confuse the main key with varietal subdivisions, I have placed keys to varieties and forms under the separate species. Some of these minor keys are newly constructed or modified from existing ones, while others, such as that for the varieties of *S. cordifolia,* I have copied verbatim from their sources.

[15] See Fernald, M. L. Persistence of plants in unglaciated areas of boreal America. (Mem. Gray Herb. **2**); Mem. Amer. Acad. **15**[3] (1925).

[16] Schneider, C. Jour. Arn. Arb. **3**: 97–106 (1921).

A key involving staminate flowers would be extremely desirable, but it could be only partially practicable with our present knowledge of the willows of this region. This is due, first, to inherent difficulties in the construction of such a key, for the degree of variability among the characters of the staminate flowers is not nearly so well-known as among those of the pistillate. Even with a relatively large amount of material before him, Schneider had only indifferent success with his key to staminate plants and found it nearly impossible to determine, by means of staminate material, many of the species in such a widespread and variable group as that related to *S. glauca.* A second major difficulty arises from the fact that, to the best of my knowledge, fully one-fourth of the species treated in this paper are known only by their pistillate plants: *cryptodonta, laurentiana, paraleuca, pedunculata, amoena, pellita, simulans, jejuna, hudsonensis, fullertonensis.* True, most of these are among the rarer species, but *S. pellita* is widespread and well-represented in the herbaria. Some of the species flower very early in the season, so that the ephemeral staminate blossoms are gone before the dates when collectors usually reach the field.

Any workable key to the willows perhaps needs some defense. An ideal diagnostic key to an ideal genus uses clear-cut unit characters that immediately separate the species. However, so many species of willows are based upon elaborate combinations of characters that such an ideal situation is scarcely ever realized. Schneider fully appreciated this and constructed a key that is to a great extent descriptive; consequently it does not depend so heavily upon individual characters. Those who have not used it extensively, or who have not had to deal with large series of specimens, are apt to be impatient with its length and complexity, not to mention the extraordinary amount of apparent equivocation that occurs in it. In a sense, these words and expressions of equivocation are an index to the practicality of the key, because they allow for a large amount of character variability while the composite pattern of the species is being outlined.

I have made no effort to present the complete synonymy of each species. Following the name are cited the place of original description of the species, variety or form, and then the papers in which this name has been used in describing the flora of our region. These papers are cited in chronological order. Likewise, such synonyms as I have mentioned are those that have been used in floras of the region. For more complete synonymy the student is referred particularly to the cited papers by Schneider, and to those by Dr. Carleton R. Ball for the sections *Cordatae, Longifoliae,* and *Pentandrae.*

In the citation of specimens, I have followed a geographic sequence beginning in the northern part of Hudson Bay with Southampton Island. Then come the western coasts of Hudson and James Bays southward to the tip of the latter, and then the eastern coasts northward. These are followed by records from the south side of Hudson Strait, Ungava Bay, and the coast of Labrador southward to the Straits of Belle Isle. The sequence then proceeds westward along the north shore of the Gulf of St. Lawrence to Seven Islands, after which come the Mingan Archipelago and Anticosti. Specimens from inland regions along this course, or islands off the coasts, are usually cited in their appropriate places; thus plants from inland Keewatin are cited opposite those from the coast in that region, and those from the Hamilton River country are usually cited opposite those from Hamilton Inlet and vicinity. Plants from northern Newfoundland are grouped with those on the Labrador side of the Straits of Belle Isle. I have

also inserted the names of territories and provinces, dividing the Quebec localities rather arbitrarily into "Northern"—those on James and Hudson Bays and Hudson Strait, and "Southern"—those on the north shore of the Gulf of St. Lawrence. In the case of islands, their correlation with political boundaries may not be infallible, for I have preferred to cite the specimens from these islands along with that part of the coast which they are nearest. I have been able to locate on maps nearly all of the localities from which I have seen specimens, but there are still several (less than half a dozen) that I have not found. These are cited only approximately in their proper places in the geographic sequence.

In each citation the name of the locality is given in roman type, and the name of the collector, with the number or numbers, in italics. If no number is available, dates have been used. The herbaria from which I have seen the specimens are indicated by symbols in parentheses. If more than one number of the same plant, locality, and collector were seen, these symbols appear only after the last number. A key to the symbols is as follows: A—Arnold Arboretum; C—Carnegie Museum; G—Gray Herbarium; M—University of Minnesota; N—New York Botanical Garden; O—National Museum of Canada.

No claim whatever is made to finality in the naming of critical specimens. There are so many of these intermediate forms, and their positions in relation to the principal species complexes are often so problematical, that at best the disposition I have made of them can represent little more than a series of opinions. Someone with a slightly different concept of the major species would arrive at entirely different conclusions.

I am deeply indebted to a number of persons and institutions for assistance. Thanks are due particularly to Dr. Abbe for entrusting me with his collections and for his patience with delays in working them up. Professor M. L. Fernald has, as usual, been a constant source of aid and inspiration. The authorities at the National Herbarium of Canada have rendered great assistance, in these days of limited travel, by loaning their large collection of willows from the region in question; and Dr. H. A. Gleason, Curator of the New York Botanical Garden, very kindly gave me access to the collections in his charge.

ARTIFICIAL KEY TO THE SPECIES BASED ON WELL-DEVELOPED FLOWERING OR FRUITING SPECIMENS

A. Bracts of the pistillate flowers not persistent in fruit, straw-colored; stamens 2, 3, or more; aments coetaneous or serotinous, borne on leafy peduncles; usually rather tall shrubs of alluvial shores, or occasionally of muskeg swamps .....Series I (p. 89).

A. Bracts of the pistillate flowers (at least toward the apex) brownish, yellowish-brown, fuscous, or atrofuscous, more rarely straw-colored, persistent in fruit; stamens 1 or 2; aments appearing before or after the leaves, sessile or pedunculate.

B. Pistillate flowers with two glands, ventral and dorsal to the pedicel; prostrate, repent shrubs; filaments (unknown in *S. jejuna*) more or less pilose .....Series II (p. 89).

B. Pistillate flowers with only one gland, ventral to the pedicel; repent or upright shrubs; staminate flowers with one or two glands; filaments pilose or glabrous.

C. Low, prostrate shrubs with rooting branches, or very small suffruticose plants; aments coetaneous or very often serotinous; the leaves mostly well-developed at anthesis. Series III (p. 89).

C. Erect or arborescent shrubs, with branches never repent and rooting (though many species are of very low and spreading form); aments usually appearing before or with the leaves .....Series IV (p. 90).

SERIES I

1. Petioles provided, toward the upper end or at the base of the blade, with distinct, often irregularly lobulate glands; leaves distinctly and rather closely serrate-dentate; aments mostly coetaneous but sometimes serotinous, borne singly on foliolate peduncles; ovary usually on a distinct pedicel 2–4 times longer than the gland; stamens 3 or more in each flower.
   2. Mature leaves distinctly whitened or glaucescent beneath, the blades elliptic-lanceolate and rather short-acuminate at the apex; aments often appearing late in the season, short-cylindric, scarcely twice longer than thick; capsule 7–12 mm. long, on a pedicel about ⅓ as long ..... 1. *S. serissima.*
   2. Mature leaves green on both sides, though often somewhat paler green beneath, broadly ovate, elliptic, or elliptic-lanceolate, more or less abruptly caudate-acuminate; aments coetaneous, frequently 2.5–3 times longer than thick; capsule 4.5–6.5 mm. long, with a relatively longer pedicel ..... 2. *S. lucida.*
1. Petioles or bases of the blades without glands; leaves linear or linear-lanceolate, subentire or rather distantly and often subspinulosely serrate; aments usually serotinous, sometimes appearing 2 or 3 on the same peduncle or lateral branchlet; capsule short-pediceled, the pedicel hardly more than twice as long as the gland; stamens 2 ..... 3. *S. interior.*

SERIES II

1. Aments mostly very short, and borne laterally on the branchlets; capsules 3–4 mm. long; lateral veins of the small, rounded, reticulate-veined leaves, even those near the base, clearly rising from the midrib; rare, prostrate species from near the Straits of Belle Isle ..... 6. *S. jejuna.*
1. Aments borne pseudo-terminally; capsules 4–7 mm. long; lateral veins of the leaves as in the last, or fewer, with two or three pairs rising from near the lower end of the midrib; leaves prominently reticulate-veined, rather coriaceous in texture.
   2. Prostrate shrubs, with leaves glabrous or nearly so; lateral veins of the leaves few, the lower ones rising from near the base; petioles elongate (up to 3 cm.); capsules scarcely over 4.5 mm. long; floral bracts only short-pilose on the inner surface ... 4. *S. reticulata.*
   2. Shrubs with prostrate or erect branchlets; leaves usually conspicuously silky-pilose on both sides (or occasionally glabrate), the veins well-scattered along the midrib; petioles not much longer than the buds; capsules 5–7 mm. long; floral bracts more or less silky-pilose on both sides ..... 5. *S. vestita.*

SERIES III

1. Ovaries and pedicels glabrous, even when young; leaves mostly crenate-dentate or glandular-crenate-denticulate (or usually entire in *S. arctophila* f. *lejocarpa*).
   2. Leaves of the same color on both sides, green, usually very small, crenate-dentate, usually rounded or often cordate at the base, sometimes retuse at the apex; floral bracts more or less uniformly colored, yellowish or violet, sparingly short-pilose; tiny arctic plants with semi-herbaceous stems and short, few-flowered aments ..... 8. *S. herbacea.*
   2. Leaves distinctly paler beneath, often pruinose.
      3. Ovaries with distinct pedicels, even when young, the pedicels of the capsules nearly always 2–3 times longer than the glands; adult leaves entire or at most inconspicuously glandular-denticulate or crenate, never marcescent. 10. *S. arctophila* f. *lejocarpa.*
      3. Ovaries subsessile, or the pedicels, even in fruit, somewhat shorter or scarcely longer than the glands; leaves glandular-crenate-denticulate (at least toward the middle and apex), the mature ones marcescent, partly long-persistent; prostrate, matted shrubs with tiny leaves; common on the Labrador Peninsula ..... 7. *S. Uva-ursi.*
1. Ovaries (sometimes only in part or only the pedicels) more or less densely pilose; capsules sometimes glabrescent; leaves entire or at most inconspicuously glandular-denticulate or crenate.
   4. Bracts of two colors, fuscous at the apex or over a large part of the surface, more or less long-silky toward the apex, sometimes only ciliate at the apex.
      5. Ventral glands rather short and broad, scarcely twice as long as thick, broadly truncate at the apex, ½ the length of the pedicels of the fruit; common species of arctic habitats, with prominent, upright, reddish aments ..... 10. *S. arctophila.*

5. Glands oblong, mostly 2½–4 times longer than thick; pedicels of the fruit shorter than the glands or rarely a little longer.
6. Leaves ovate or ovate-elliptic, oval or obovate-oblong, often plicate at the apex, rounded to broadly cuneate at the base, glabrous or nearly so, green and shining above, resembling those of *S. arctophila,* though somewhat narrower; rare species of the west and northwest coasts of Hudson Bay .....11. *S. hudsonensis.*
6. Leaves variously shaped, from elliptic-obovate to broadly rounded-ovate, green above, but scarcely shining, silky-hairy at least when young; a common and highly variable species as represented in Eastern Arctic America .....9. *S. arctica* vars.

4. Bracts uniformly colored, straw-colored, yellowish, or light brown, rather short-pilose (the hairs shorter than the bracts), sometimes glabrate on the inner surface.
7. Petioles very short, rarely up to 2 mm. long; rare, prostrate species of northern Hudson Bay and the arctic continental coast .....15. *S. fullertonensis.*
7. Petioles well-developed, mostly over 2 mm. long; the more prostrate forms of the commonly erect .....13. *S. cordifolia.*

Series IV

1. Ovaries and pedicels glabrous, even when young.
2. Pedicels distinct, even at anthesis 2–6 times as long as the glands; styles (and stigmas) short.
3. Bracts uniformly colored, yellowish or yellowish-brown, in life sometimes a little reddish, often becoming brown in drying; aments coetaneous, even the flowering ones borne on foliolate peduncles.
4. Leaves giving off a balsamic odor, even long after they are dried; leaflets and leaves glandular-crenate-serrate all around, very often cordate at the base, broadly ovate, elliptic, or elliptic-oblong; petioles 5 mm. long or more; glands short, somewhat thicker than long; capsules rostrate, 7–9 mm. long exclusive of the pedicels. 21. *S. pyrifolia.*
4. Leaves not giving off a balsamic odor; leaflets and leaves entire, not cordate, narrowly lanceolate to broadly oblanceolate, elliptic-lanceolate, or elliptic; petioles, even of the mature leaves, scarcely more than 6 mm. long; glands oblong-ellipsoid; capsules rather obtusely conic, 6–7 mm. long exclusive of the pedicels; erect shrubs, 1–3 ft. high, of bogs and wet shores .....30. *S. pedicellaris* var. *hypoglauca.*
3. Bracts of two colors, fuscescent for the most part or at the apex; flowering aments subsessile on the branchlets.
5. Styles 1–1.25 mm. long; aments at anthesis 2.5–3.5 : 0.9 cm., in fruit up to 8 : 2 cm. (exclusive of the peduncles); capsules 9–10 mm. long exclusive of pedicels 2–2.5 mm. long; upper leaf surfaces bright green and more or less shining; shrub up to 16 ft. high, of gravelly shores and alluvium .....19. *S. glaucophylloides.*
5. Styles hardly over 0.8 mm. long; aments and capsules shorter; upper leaf surfaces rather dull green.
6. Flowering twigs more or less yellow or flavescent; capsules 4–5 mm. long exclusive of pedicels 1.5–3 mm. long; tall shrubs of river flood plains ...17. *S. lutea.*
6. Flowering twigs fuscous, brownish or castaneous.
7. Leaves glaucous beneath; medium to tall shrubs of wet soil .....16. *S. cordata.*
7. Leaves of the same color on both sides (except in *myrtillifolia* var. *brachypoda*) or only a little paler green beneath; low, spreading shrubs of mossy bogs. 18. *S. myrtillifolia.*

2. Pedicels none or short, even in fruit not more than twice as long as the glands; styles (and stigmas) varying in length.
8. Stipules of the preceding year persistent; aments thick-cylindric, sessile, 1–3 pseudo-terminal toward the ends of short twigs; branchlets, at least when young, densely hirsute-villous or woolly.
9. Stipules linear- to half-cordate-lanceolate, acuminate, glandular-serrate-dentate; twigs of the year hirsute-tomentose; leaves obovate-elliptic or elliptic-lanceolate or obovate-oblong; petioles 5–15 mm. long; mostly upright, medium shrubs of the northwestern part of our area .....22. *S. Richardsonii.*
9. Stipules half-cordate to reniform, entire or glandular-denticulate; twigs of the year hirsute-lanate; leaves broadly ovate or elliptic-orbicular, often cordate at the base; petioles commonly not over 2, or scarcely ever over 4 mm. long; mostly low, erect, spreading or matted shrubs .....23. *S. calcicola.*

8. Stipules none or not persistent; aments often coetaneous, sessile or pedunculate, for the most part distinctly lateral.
10. Aments, even in flower, distinctly pedunculate, provided at the base with small, rather normal leaflets; pubescence of the bracts scarcely or not at all curly.
11. Leaves distinctly glandular-serrate with fine teeth, often fimbriate, more or less densely pilose .....20. *S. adenophylla.*
11. Leaves entire, sparsely floccose-lanate .....24. *S. Wiegandii.*
10. Aments, even in fruit, sessile or subsessile, provided at the base only with very small, scale-like leaflets; pubescence of the bracts more or less distinctly curly.
12. Medium to tall shrubs of low ground .....16. *S. cordata.*
12. Low, spreading shrubs of mossy bogs .....18a. *S. myrtillifolia* var. *brachypoda.*
1. Ovaries (rarely only the pedicels or the base of the ovaries) pilose.
13. Pedicels distinct, even at anthesis 2–6 times as long as the glands.
14. Bracts uniformly colored, yellowish-straw-colored or yellowish-brown; aments coetaneous.
15. Styles none or very short, not longer than the short-oblong stigmas; pubescence of the leaves villous-tomentose or the leaves glabrescent; medium or tall shrubs, commonly in dry or damp woods and thickets .....29. *S. Bebbiana.*
15. Styles distinct, equaling or somewhat longer than the stigmas.
16. Pubescence of the leaves silvery-silky; flowering twigs glabrous, fuscous; capsules, exclusive of the pedicels, 4.5–5.5 mm. long; low, erect or bushy shrubs of arctic and alpine habitats .....40. *S. argyrocarpa.*
16. Pubescence of the leaflets and flowering twigs villous-tomentose; capsules about 7 mm. long, exclusive of the pedicels; tall shrubs, 10–14 ft. high, of Newfoundland and the Mingan Islands .....28. *S. cryptodonta.*
14. Bracts of two colors, fuscescent for the most part or toward the apex; aments often precocious.
17. Stigmas rather long, 4–5 times longer than thick, mostly 1–1.5 (–2) mm. long, longer than the styles which are often obsolete; capsules 7–14 mm. long exclusive of pedicels 1–3.5 mm. long; large shrubs of low, wet ground .....33. *S. discolor.*
17. Stigmas short-oblong, scarcely over 3 times longer than thick, usually less than 1 mm. long; styles evident, about as long as the stigmas; capsules usually shorter than in the last; medium shrubs of dry woods and barrens .....32. *S. humilis.*
13. Pedicels none or short, even in fruit scarcely more than twice as long as the glands.
18. Flowering twigs more or less distinctly pruinose; aments precocious; pubescence of the leaves distinctly lustrous; tall shrubs of swamps and alluvium .....36. *S. pellita.*
18. Flowering twigs not pruinose, or if so the leaves glabrous; pubescence of the leaves if present dull or silvery-silky.
19. Bracts of the flowers uniformly colored, yellowish-straw-colored or yellowish-brown.
20. Petioles very short, mostly 1–2 mm. long, not exceeding well-developed buds; stipules about equaling or twice as long as the petioles.
21. Prostrate shrubs with rooting branches; rare species of northern Hudson Bay and the continental arctic coast; aments in fruit cylindric, 2: 1 to 4: 1.3 cm. 15. *S. fullertonensis.*
21. Small upright shrubs with branches often rather short and somewhat twisted; aments short-oblong to spherical .....14. *S. brachycarpa.*
20. Petioles well-developed, longer than the buds or stipules.
22. Leaves usually much longer than broad, those of the peduncles oblong, about 2.5–3.5 times longer than wide; aments usually loosely flowered toward the base.
23. Leaves subcoriaceous, glabrous or glabrate (sparsely pilose when young), closely resembling those of *S. pedicellaris* var. *hypoglauca* ..31. *S. simulans.*
23. Leaves not coriaceous, silky-pubescent when young and often rather tardily glabrate.
24. Styles very short, sometimes divided nearly to the base, much less than 1 mm. long; plants of the Hudson Bay region, mostly low or medium shrubs. 12. *S. glauca.*
24. Styles distinct, 1 mm. long; rare species of N. Newfoundland; shrubs, up to 6 or 7 ft. high .....37. *S. amoena.*
22. Leaves usually short-oblong or -ovate to rounded, those of the peduncles broader and shorter, scarcely up to 2.5 times longer than broad; low, spreading, or matted shrubs .....13. *S. cordifolia.*

19. Floral bracts of two colors, fuscous in large part or at least toward the apex.
25. Twigs, even the flowering ones, more or less tomentulose or villosulous, more densely pilose when young (try also *S. paraleuca,* which has the flowering twigs ashy-pilose when young).
26. Aments, even in fruit, hardly over 5 : 1.5 cm. excluding the peduncles; ovaries covered with a dense, subfloccose or subfarinaceous tomentum; capsules ellipsoid-conic, 7–8 mm. long excepting the pedicels which are scarcely 1 mm. long; upright bog shrubs of medium or small stature, usually with a hoary appearance .....27. *S. candida.*
26. Aments, even in flower, mostly over 4 cm. long, in fruit up to 7–13 cm., the pubescence not at all farinaceous.
27. Stipules oblique- or half-cordate-ovate; leaves glabrescent beneath or sparsely floccose-lanate; petioles not dilated at the base.
28. Leaves large (up to 20 cm. long), crenate, glabrescent beneath; petioles 1–2 cm. long; styles 0.5–1 mm. long; tall shrubs up to 16 ft. high. *26. S. laurentiana.*
28. Leaves smaller, mostly 1.5–4 cm. long, entire, loosely floccose-lanate on both sides; petioles 3–8 mm. long; styles up to 2 mm. long; low, spreading shrubs scarcely over 1 ft. high .....24. *S. Wigandii.*
27. Stipules linear-lanceolate; leaves covered beneath with a very dense, opaque, soft, white tomentum, glabrate above; petioles dilated toward the base, often partially covering the buds; stout shrubs with heavily greyish- to white-pubescent twigs, known in our region only in the northwestern and northern Hudson Bay districts .....25. *S. alaxensis* var. *obovalifolia.*
25. Flowering twigs, and often even the young ones, glabrous, or ashy-pilose when young and soon glabrate.
29. Styles short, 0.2–0.8 mm. long; capsules 3.5–7.5 mm. long, blunt; aments rather narrowly cylindric; leaves definitely crenate-dentate or rather sharply and finely serrate, more or less fulvous-silky when young.
30. Capsules very short, 3.5–4 mm. long; leaves oblanceolate or oblanceolate-oblong, crenate-dentate; rare, tall shrubs of the Gulf of St. Lawrence area. *35. S. paraleuca.*
30. Capsules 5–7.5 mm. long; leaves rather narrowly lanceolate or elliptic-lanceolate, sharply and finely glandular-serrate, short-silky-villous beneath or glabrate in age; known in our region only on the west coast of Hudson Bay. *39. S. arbusculoides.*
29. Styles longer, 0.8–1.5 mm. long; capsules 5–8 mm. long, lanceolate-ovoid to conic-rostrate; aments somewhat thicker or short-cylindric; leaves entire or remotely undulate, or rather indistinctly glandular-crenate-denticulate, nearly or entirely glabrous even when young.
31. Aments definitely pedunculate, the peduncles 1–3.5 cm. long, leafy.
32. Floral bracts yellowish, 2–3 mm. long; styles 1 mm. long; pedicels 1–1.5 mm. long, but little longer than the glands; rare shrubs of N. Newfoundland, up to 6 ft. tall .....37. *S. amoena.*
32. Floral bracts blackened, 3.5–4.5 mm. long; styles 1.2–1.5 mm. long; pedicels 1.5–2 mm. long, twice as long as the glands; low to medium shrubs, up to 5 ft. high, of N. Newfoundland; rare .....36. *S. pedunculata.*
31. Aments sessile or nearly so, with a few short bracts at the base; tall spreading shrubs of swamp margins, or low and spreading in arctic or alpine habitats .....34. *S. planifolia.*

1. **Salix serissima** (L. H. Bailey) Fernald in Rhod. **6:** 6 (1904); Macoun, J. M. in Ottawa Nat. **20:** 139 (1906); Schneider in Jour. Arn. Arb. **1:** 13–14 (1919), **3:** 63 (1921); Ball in Bot. Gaz. **72:** 220 (1921), in Can. Field Nat. **40:** 147 (1926).—*S. lucida* Muhl. var. *serissima* L. H. Bailey ex Arthur in Bull. Geol. Nat. Hist. Surv. Minn. **3:** 19 (1887).

No specimens of *S. serissima* have been collected from our area in recent years. Knowledge of its existence there rests upon early collections by Spreadborough and the Macouns, all of which I have seen. Schneider gives its northern limits in Newfoundland (Valley of Exploits R.), Anticosti I., the eastern shores of

James Bay, and the Severn R. He does not cite any specimens except the one from Severn R. (*J. M. Macoun 2028,* O). There are fragments of this specimen in the Gray Herbarium, as well as fragments of a collection by J. M. Macoun on Berens R., Man. (*no. 24618*), and from one by John Macoun on Anticosti (*no. 24584*). The original of the last is at Herb. O. All of these were cited by J. M. Macoun in 1906 (l. c.), together with a specimen from the mouth of the Albany R. (*Spreadborough 62628,* O, N), on the *west* coast of James Bay. It is presumed that Schneider saw all of the above specimens, and that his record for the *east* coast of James Bay is a mistake in the noting of Spreadborough's material. The Severn R. specimen may be located with fair accuracy by reference to A. P. Low's report on the survey between Lake Winnipeg and Hudson Bay in 1886 (G. S. C. Ann. Rept. **1886**: Pt. F. 1887).

The southwestern part of our area approaches the region of overlap for *S. serissima, S. lucida,* and their western relative, *S. lasiandra* Benth. The eastern limits of the latter are as yet uncertain, but specimens which I have provisionally so determined have been sent me by A. J. Breitung from various points along the Saskatchewan and Red Deer Rivers in east-central Saskatchewan. I have already noted the difficulty of distinguishing between *S. serissima* and *S. lasiandra* in northern Alberta where they occur together (Contr. Arn. Arb. **6**: 142–143, 1934; Jour. Arn. Arb. **17**: 228–229, 1936).

2. **Salix lucida** Muhl. in Neue Schr. Ges. Naturf. Fr. Berlin **4**: 239, *t. 6, fig. 7* (1803); Macoun, J., Cat. Can. Pl. 1^3: 450 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88**: 70J (1889), 362L (1897); Schneider in Jour. Arn. Arb. **1**: 20 (1919), **3**: 63 (1921); Ball in Bot. Gaz. **72**: 227 (1921); St. John in Victoria Mem. Mus. Mem. **126**: 78 (1922); Wetmore in Rhod. **25**: 8 (1923); Fernald in Rhod. **28**: 177 (1926); Lewis in Can. Field Nat. **45**: 227 (1931).

Apparently confined to the southern parts of our area. Besides the typical form, two variations have been commonly recognized, both of which appear to have some geographic significance at least.

Leaves [17] more or less broadly ovate- or elliptic-lanceolate, rather abruptly caudate-acuminate.
New twigs and new leaves glabrous or very soon glabrescent .....2. *S. lucida.*
Twigs of the current year, and sometimes in part those a year old, provided with a dirty grey or reddish pubescence; leaves rather pilose at the beginning, (reddish-)pilose at least on the veins beneath even in age .....2b. *S. lucida* var. *intonsa.*
Leaves more or less narrowly lanceolate, rather gradually acuminate.
2a. *S. lucida* var. *angustifolia.*

The following specimens may be assigned to typical *S. lucida:* MANITOBA: Hill (Hayes) R., Hudson Bay, *R. Bell 24585* (O).—ONTARIO: Moose Factory, *Spreadborough 62619* (O).—S. QUEBEC: Blanc Sablon, *Fernald & Wiegand 3146* (G); same, *Fernald & Long 27933* (G); Augustin R., *St. John 90349* (O, G); Romaine, *Lewis 130754* (O); Mingan R., *Victorin & Rolland 24797* (G); Seven Islands, Pt.-a-la-Marmite, *Victorin & Rolland 18884, 18886* (G).

2a. **Salix lucida** var. **angustifolia** Anderss. in Proc. Am. Acad. Sci. **4**: 54 (1858); Potter in Rhod. **3**: 279 (1934).—*S. lucida* f. *angustifolia* Anderss., Schneider in Jour. Arn. Arb. **1**: 22 (1919).

SPECIMENS EXAMINED: ONTARIO: Moose Factory, *Gardner 22* (A); same, *Todd June 9, 1941* (C); north end of Saw Pit I., Moose R., *Potter 911* (G); Bushy I., Moose R., *Potter 910* (G); Ship Sand I., Moose Factory, *Gardner 77* (A); East Pt., James Bay, *Todd June 28, 1941* (C).—N. QUEBEC: East Main, *Murie* (C).—LABRADOR: Head of Grand L., L. Melville distr., *Wetmore 102920* (O); along bank of Hamilton R. above Muskrat Falls, *M. T. Doutt 3159* (C).

[17] From Schneider, in Jour. Arn. Arb. 1: 3 (1919).

2b. **Salix lucida** var. **intonsa** Fernald in Rhod. **6:** 2 (1904); Schneider in Jour. Arn. Arb. **1:** 22 (1919), **3:** 63 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 78 (1922); Wetmore in Rhod. **25:** 8 (1923); Lewis in Can. Field Nat. **45:** 227 (1931); Bowman in Rhod. **34:** 52 (1932), as *S. lucida.*

Forms with more or less permanent pubescence on twigs and leaves are separated as var. *intonsa.* They are known in our area on the north shore of the Gulf of St. Lawrence; and Wetmore collected one as far north as the shore of Grand Lake, a western extension of Lake Melville.

Specimens examined: Labrador: Head of Grand L., L. Melville distr., *Wetmore 102921* (O).—S. Quebec: Bradore Bay, *Lewis 130752* (O); Little Mecatina R., *Todd June 26, 1928* (C); Natashquan, *Townsend July 24–Aug. 10, 1912* (G); same, *Victorin & Rolland 28106, 28116* (G); Romaine, *St. John 90350* (O, G); Mingan, *Lewis 130753* (O); Mingan R., *Victorin & Rolland 24802* (O, G).—Mingan Islands: Ile a la Proie, *Victorin & Rolland 21687* (G), and Ile a la Chasse, *24947* (G).—Riv. au Renard, Anticosti, *Victorin & Rolland 27754* (G); Moisie R., *Bowman 275* (G).

3. **Salix interior** Rowlee in Bull. Torr. Bot. Cl. **27:** 253, *pl. 9, figs. 12, 13* (1900); see also Ball in Can. Field Nat. **40:** 175 (1926).—*S. longifolia* Muhl. not Lam., Schneider in Bot. Gaz. **67:** 340 (1919), in Jour. Arn. Arb. **3:** 65 (1921); Potter in Rhod. **36:** 279 (1934).

Within our region the sandbar willow, so far as present knowledge indicates, seems to be confined to the extreme southern end of James Bay and the rivers draining into it. It is to be expected, however, on many of the streams draining into the southwest sides of Hudson and James Bays. All the specimens that I have seen appear to represent the broader-leaved typical form rather than the narrow-leaved var. *pedicellata* (Anderss.) Ball, although the Gardner specimen (*no. 105*) and one of Potter's (*no. 895*) approach the latter.

Specimens examined: Ontario: Allen I., Abitibi R., *Potter 895* (G); Bushy I., Moose R., *Potter 894* (G); west shore of Moose R., opposite Ship Sand I., *M. T. Doutt 2149* (C); east shore of Hayes I., 2½ mi. E. of Moosonee, Moose R., *M. T. Doutt 2000* (C); Moose Factory, *Spreadborough 62621* (O); south shore of James Bay, *Gardner 105* (A).

4. **Salix reticulata** L., Sp. Pl. **2:** 1018 (1753); Macoun, J. in Geol. Surv. Can. Rept. Prog., **1879–80:** 64C (1881), Cat. Can. Pl. **1**[3]**:** 454 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), **1895:** 362L (1897), **1898:** 36M (1901); Tyrrell in Geol. Surv. Can. Ann. Rept. **1896:** 213F (1898); Rydberg in Bull. N. Y. Bot. Gard. **1:** 260 (1899); Schneider in Bot. Gaz. **67:** 44 (1919), in Sargent, Pl. Wilson. **3:** 144 (1916), in Jour. Arn. Arb. **3:** 66 (1921); Fernald in Rhod. **28:** 177 (1926); Güssow in Can. Field Nat. **47:** 117 (1933); Størmer in Nyt. Mag. f. Nat. **32:** 266 (1933); Abbe in Rhod. **38:** 146 (1936); Raup in Mem. Carn. Mus. **12**[3]**:** 22 (1936); Grøntved in Rept. 5th Thule Exp. **2:** 34 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 151 (1940).

Although common on the Hudson Bay coasts and in the Arctic Archipelago (cf. Polunin, l. c.), this willow has not been extensively collected on the eastern Labrador coast, and not at all from the north shore of the Gulf of St. Lawrence. It occurs in northern Newfoundland, however, at the Straits of Belle Isle. Its known southern limit in the Hudson Bay area is on South Twin I. in James Bay. The species is exceedingly well marked, and even though specimens from our region probably could be found to represent various of the growth forms that have been described, I am inclined to agree with Polunin in disregarding them as of little taxonomic significance.

Specimens examined: Franklin: Lake Harbor, Baffin I., *Oldenburg 82* (M); Dorset, Baffin I., *Oldenburg 170A* (M); Nottingham I., *R. Bell 18849* (O).—Keewatin: Southampton I., *Sutton July 2, 23, 1929–30* (C); same, *Oldenburg 188C* (M); Mansfield I., *R. Bell 54350* (O); Rankin Inlet, *J. M. Macoun 79146, 79147* (O).—Manitoba: Churchill, *coll.?, July, 1931* (C); same, *Gardner 4* (O); same, *J. M. Macoun 79142* (O, G).—Ontario:

W. coast of Hudson Bay, lat. 56°, *J. M. Macoun 18850* (O); South Twin I., *M. T. Doutt 2267* (C); same, *J. M. Macoun 18847* (O); Raft R., W. coast of James Bay, *Spreadborough 6269* (O).—N. QUEBEC: Island near mouth of Seal R., Cape Jones, *Abbe & Marr 4140* (M, G); Little Cape Jones, *Sutton July 19, 1926* (C); mainland at S. end of Manitounuk Sd., *E. C. & L. B. Abbe 3971* (M, G); Bill of Portland I., *M. T. Doutt 2701* (C); Tukarak I., Belcher Isls., *J. K. Doutt 84, 125* (C); same, *Abbe & Marr 4057* (M, G); Little Whale R., *Low 63270* (O); along coast of Hudson Bay near Richmond Gulf, *Spreadborough 13661* (O).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3459, 3460* (M, G); Cairn I., *Abbe & Marr 3042* (M, G).—Port Harrison, *Todd July 2, 1930* (C); same, *Malte 120793, 120796* (O); Gilmore I., lat. 59° 50′, *Dutilly, O'Neill & Duman 87453* (G); Smith I., *Malte 120888* (O).—LABRADOR: Port Burwell, *Malte 126822* (O, G), *118644, 118645, 119992, 120022, 121056, 121062* (O); same, *E. L. Borden 63041* (O); Wakeham Bay, *Malte 118654, 120221* (O); Cape Chidley, *R. Bell 54349* (O); Clark Harbor, *Wynne-Edwards 7162* (O); Northwest Bank at head of Ryan's Bay, *Woodworth 143* (G); Nachvak, *R. Bell 54351* (O); Rowsell Harbor, lat. 58° 58′, *Abbe & Odell 210* (O, G).—NEWFOUNDLAND: Flower Cove, *Fernald, Long & Dunbar 26585* (G); same, *A. G. Huntsman Sept. 2, 1923* (G).

5. **Salix vestita** Pursh, Fl. Amer. Sept. **2:** 610 (1814); Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80:** 64C (1881), Cat. Can. Pl. **1**[3]**:** 455 (1886); Macoun, J. M. in Geol. Surv. Can. **1895:** 362L (1897); Rydberg in Bull. N. Y. Bot. Gard. **1:** 260 (1899); Schneider in Bot. Gaz. **67:** 45 (1919), in Jour. Arn. Arb. **3:** 66 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922); Fernald in Rhod. **28:** 177 (1926); Lewis in Can. Field Nat. **45:** 228 (1931); Grøntved in Rept. 5th Thule Exp. **2:** 35 (1936); Abbe in Rhod. **38:** 146 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 153 (1940).

Salix vestita appears on the southeastern and western shores of Hudson Bay, and is common on the eastern Labrador coast down to the Straits of Belle Isle and Newfoundland. It also appears on the Mingan Islands. In Hudson Bay its known northern limits are at Churchill and Richmond Gulf, while its northern limit on the Atlantic side is at Akpatok I. (cf. Polunin, l. c.). On the Labrador coast it largely replaces the more arctic *S. reticulata.* Two varieties have been described which should be noted in our region. The following key (Fernald & St. John in Victoria Mem. Mus. Mem. **126:** 44, 1922) is useful in distinguishing these varieties.

Capsules narrowly ovoid, definitely tapering to the blunt tip; pistillate catkin 0.5–3 cm. long; staminate catkin 0.6–2 cm. long; leaves obovate or orbicular, usually somewhat retuse and reticulately veined.
  Leaves permanently clothed beneath with soft, white, silky pubescence; staminate catkin 1–1.5 cm. long; winter buds pubescent at least at the tip .....5. *S. vestita.*
  Leaves nearly glabrate beneath, a few hairs persisting on the veins, even the young leaves only sparsely clothed; staminate catkin 1.7–2.5 cm. long; winter buds quickly glabrate and lustrous .....5a. *S. vestita* var. *psilophylla.*
Capsules only slightly tapering to the broad rounded summit; pistillate catkin 2–5 cm. long; staminate catkin 1–3 cm. long; leaves elliptical or oblong, often subacute, usually plane above .....5b. *S. vestita* var. *erecta.*

SPECIMENS EXAMINED (typical form): ONTARIO: Fort Severn, *J. M. Macoun 24819* (O).—N. QUEBEC: mainland at lower end of Manitounuk Sd., *E. C. & L. B. Abbe 3969* (M, G).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3087, 3777* (M, G); Cairn I., *Abbe & Marr 3058, 3535* (M, G); Beach Cr., *E. C. & L. B. Abbe 3292* (M, G).—Along Ungava R., *Spreadborough 13656* (O); Ungava Bay (Ft. Chimo), *L. M. Turner 6310* (G); same, *J. D. Soper 122086* (O).—LABRADOR: Kikkertaksoak, Saglek Bay, *Abbe 214* (G); near head of Nachvak, *Brooks 213* (G); same, *Woodworth 144* (G); same, *R. Bell 24811* (O); Rowsell Harbor, *Abbe & Odell 212* (O); Rama, *Sornborger 179* (G); Hebron, *Oldenburg 37A, 39C* (M); same, *Todd Sept. 16, 1926* (C); same, *Polunin 1013* (O); same, *J. D. Soper 122084* (O); same, *Wynne-Edwards 7061* (O); summit of Bishop's Mitre, Kaumajet Mts., *Abbe 216* (O, G); Ogualik I., *Brooks 215* (O, G); Cut Throat Harbor, S. of Cape Mugford, *A. E. Porsild 181* (O, G); Okkak, *Wynne-Edwards 7466* (O); Flint I., near Port Manvers, *Bryant 68* (G); same, *Dutilly, O'Neill & Duman 7649* (G); September Harbor, *Bishop 231* (O, G); same, *Sewell 11* (G); Hopedale, *Bishop 232* (O, G); Hamilton R.,

Asanipi Branch, *Low 6048* (O); Battle Harbor, *Waghorne 2* (A); "Capsan" I., *Waghorne 3* (pt.) (A).—S. QUEBEC & NEWFOUNDLAND: Blanc Sablon, *Townsend July 29–31, 1915* (G); same, *Fernald & Wiegand 3199* (G); same, *Lewis 130688, 130689* (O); Flower Cove, Nfld., *A. G. Huntsman Sept. 2, 1923* (G); St. Anthony, Nfld., *Abbe 211* (O).—Mingan Islands and vicinity: Eskimo Pt., *Townsend June, 1909* (G); Eskimo I., *St. John 90377* (O, G); same, *Abbe 1113, 1118* (G); same, *Victorin & Rolland 18895, 18899, 18900* (G); Ile St. Charles, *Victorin & Rolland 18896, 18897, 24800* (G); Ile a la Proie, *Victorin & Rolland 21683* (G); Grand Ile, *Victorin & Rolland 21685* (G); Pte. aux Ammonites, *Victorin & Rolland 18898.*—Anticosti, Southwest Pt., *John Macoun 24813* (O); L. Mistassini, *coll.? 24812* (O).

5a. **Salix vestita** var. **psilophylla** Fernald & St. John in Victoria Mem. Mus. Mem. **126:** 44 (1922).

This plant, collected by St. John on limestone sea-cliffs, Eskimo I. (Mingan Isls.), *90378* (O, G), is distinguished by its thin, pale leaves which are glabrescent beneath.

5b. **Salix vestita** var. **erecta** Anderss. ex DC. Prod. **16**^{2}**:** 300 (1868); Schneider in Bot. Gaz. **67:** 45–46 (1919), in Jour. Arn. Arb. **3:** 66 (1921).

A western, Rocky Mountain form of *S. vestita,* with more erect habit, was originally described as *S. Fernaldii* Blankinship in Mont. Agric. Coll. Sci. Stud. **1:** 46 (1905). Schneider, l. c., has pointed out that it can hardly be regarded as a species, and that Andersson's varietal name, *erecta,* should be used for it. The following are plants from our region which strongly suggest this variety.

SPECIMENS EXAMINED: MANITOBA: Churchill, *J. M. Macoun 79143* (O, G).—N. QUEBEC: Great Whale R., *M. T. Doutt 2620* (C); Bill of Portland I., *M. T. Doutt 2682* (C).—LABRADOR: Grand Falls, Hamilton R., *M. T. Doutt 3374* (C).—S. QUEBEC: Ile Ste. Genevieve (Mingan Isls.), *Victorin & Rolland 18901* (G).

Schneider annotated the Churchill specimen in the Gray Herbarium as "Difficult to distinguish from typical *vestita";* and the same may be said of the Doutt specimens from Hudson Bay and Grand Falls. They have a distinctly erect habit, and their leaves are somewhat narrowed and pointed. Still another eastern specimen in the Gray Herbarium, from Cap Rosier, Gaspé Co., Quebec (*Stebbins 839*) has been named var. *erecta.* Both this and the Mingan material (the latter is sterile) seem to represent the variety better than do those noted above. Their leaves are notably narrower than those of most eastern plants, and the ones from the Gaspé are nearly acute at the apex.

6. **Salix jejuna** Fernald in Rhod. **28:** 177 (1926).

So far as is known at present, this distinctive little species is confined to the region about the Straits of Belle Isle. When first described it was related to forms of *S. arctica,* which it most nearly resembles in habit and in the pattern of leaf venation. However, it proves to have two glands at the base of each flower, a character that brings it into the group containing *S. reticulata* and *S. vestita.* The rather strong reticulation of its leaves also suggests these species. It differs from them clearly in its leaf venation and in bearing its aments laterally, rather than pseudoterminally.

SPECIMENS EXAMINED: LABRADOR: Henley I., Chateau Bay, *A. G. Huntsman Sept. 7, 1923* (G).—NORTHERN NEWFOUNDLAND: Cape Norman, *Wiegand & Long 27950* (G, TYPE); Big Brook, Str. of Belle Isle, *Fernald, Wiegand & Hotchkiss 27986* (G); Four Mile Cove, Str. of Belle Isle, *Fernald, Wiegand & Long 27949* (G).

7. **Salix Uva-ursi** Pursh, Fl. Amer. Sept. **2:** 610 (1814); Bebb in Bull. Torr. Bot. Cl. **16:** 212 (1889); Macoun, J., Cat. Can. Pl. **1**^{3}**:** 455 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 362L (1897), **1898:** 36M (1901); Rydberg in Bull. N. Y. Bot. Gard. **1:** 278 (1898); Schneider in Bot. Gaz. **67:** 50 (1919), in Jour. Arn.

Arb. **3:** 66 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922); Lewis in Can. Field Nat. **45:** 228 (1931); Abbe in Rhod. **38:** 147 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 154 (1940).

Common on the northern Quebec and Labrador coasts south at least to Great Whale R. on the west, and to the Gros Mecatina R. on the north shore of the Gulf of St. Lawrence. It extends north to southern Baffin Island (cf. Polunin, l. c.), and south to the New England mountains and the Adirondacks. It has not been collected on the west coast of Hudson Bay. The species is remarkably consistent throughout its range, though occasional specimens show intergradations with *S. arctophila* Cock. Polunin, l. c., has noted these in the eastern Arctic, and among the specimens cited below, *Abbe & Marr 3183* illustrates the same tendency. This plant has the habit, leaves, and ament-size of *S. Uva-ursi,* but it has the longer pedicels of *S. arctophila.* Schneider, l. c., has pointed out that Andersson's var. *labradorica* (DC. Prod. **16²:** 292, 1868), from near Okkak, is scarcely distinguishable from the typical form.

Specimens examined: N. Quebec: Near mouth of Great Whale R., *E. C. & L. B. Abbe 3983* (M, G); same, *M. T. Doutt 2532, 2543* (C); Bill of Portland I., *M. T. Doutt 2635* (C); Tukarak I., Belcher Isls., *J. K. Doutt 3, 11, 28, 61* (C); same, *Abbe & Marr 4056* (M, G).—Richmond Gulf: *Spreadborough 54361* (O); mainland S. of Cairn I., *Abbe & Marr 3085, 3160, 3161, 3183, 4185* (M, G); Beach Cr., *Marr 4369, 4376* (M).—Seal L., *Spreadborough 13655* (O); Nastapoka, *Murie June 16, 1915* (C); Port Harrison, *Todd July 2, 1930* (C); same, *Malte 120831* (O); same, *Oldenburg 230A* (pt.) (M); opposite Digges I., *Low 23035* (O); Sugluk, *Oldenburg 157B* (M); Wakeham Bay, *Malte 126941* (O, G); Fort Chimo, *Ney & Courtright 2435* (O); Port Burwell, *J. M. Macoun 79150* (O, G), *79151* (O); same, *Malte 126805, 126837* (O, G), *119995, 120039, 120065, 121050, 121052* (O); same, *Oldenburg 51B* (M); same, *L. E. Borden 63039* (O); Cape Chidley, *R. Bell 54362, 54363* (O).—Labrador: Valley of Bryant Lakes, Kangalaksiorvik, *Abbe 221* (O, G); Kangalaksiorvik Bay, *Bryant 67* (G); Razorback Mt., Ryan's Bay, *Woodworth 146* (G); Precipice Ridge, Torngat Mts., lat. 59° 15′, *Abbe 220* (G); vicinity of head of Nachvak Bay, *Woodworth 145, 148* (G); 20 mi. N. of Nakvak, *H. S. Forbes 64* (G); Kikkertaksoak I., Saglek Bay, *Woodworth 147* (G); Hebron, *Polunin 1014* (pt.) (O); same, *Wynne-Edwards 7093* (O); Cape Mugford Penins., *Abbe 219* (G); Nain, *R. Bell 18852* (O); same, *Bishop 233* (G); 15 mi. W. of Nain, *H. S. Forbes 66* (G); Anatolak, *Sewell 458* (pt.) (G); Davis Inlet, *L. M. Turner 629* (G); Hopedale, *Bishop 234* (G); same, *Sornborger 176* (G); L. Petitsikapau, *Low 6051* (O); Webeck Harbor, *Sornborger 9* (G); Tub Harbor, *Sornborger 8* (G); Cutthroat Harbor, *A. E. Porsild 180* (O); Salmon Bight, *A. E. Porsild 28* (O); Gready I., *Bryant 65* (G); same, *Bishop 235* (O, G); Fanny's Harbor, *Townsend 36* (G); Battle Harbor, *Waghorne 38* (A); same, *Abbe 218* (G); same, *Bishop 236* (G).—S. Quebec & Newfoundland: Blanc Sablon, *Fernald & Wiegand 3169* (G); same, *Abbe 1106* (G); same, *M. T. Doutt 3001* (C); Brest, *St. John 90375, 90376* (O, G); St. Anthony, Nfld., *Abbe 217* (O); Cross Harbor, Great Mecatina I., lat. 58° 52′, *Abbe 1120* (G).

8. **Salix herbacea** L., Sp. Pl. 2: 1918 (1753); Macoun, J., Cat. Can. Pl. **1³:** 449 (1886); Bebb in Bull. Torr. Bot. Cl. **17:** 150 (1890); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 362L (1897), **1898:** 36M (1901); Tyrrell in Geol. Surv. Can. **1896:** 213F (1898); Rydberg in Bull. N. Y. Bot. Gard. **1:** 277 (1899); Schneider in Bot. Gaz. **67:** 52 (1919), in Jour. Arn. Arb. **3:** 67 (1921); Fernald in Rhod. **28:** 177 (1926); Güssow in Can. Field Nat. **47:** 117 (1933); Abbe in Rhod. **38:** 147 (1936); Grøntved in Rept. 5th Thule Exp. **2:** 34 (1936); Raup in Mem. Carn. Mus. **12³:** 22 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 155 (1940).

Schneider, l. c., says that *S. herbacea* "has almost exactly the same range as *S. Uva-ursi,*" but a glance at the maps shows that it has a considerably wider range in our region than the latter. True, its southern limits on the Labrador Peninsula and the New England mountains are approximately the same, but it has been collected several times on Southampton Island and on the northwest shores of Hudson Bay, where *S. Uva-ursi* has never been found. Also, it ex-

tends considerably farther north in the Arctic Archipelago than *S. Uva-ursi* (cf. Polunin, l. c.), reaching North Devon Island. Furthermore, although like *S. Uva-ursi* it is not represented in western Arctic America, it is a wide-ranging circumpolar species, while *S. Uva-ursi* is confined to northeastern America.

SPECIMENS EXAMINED: FRANKLIN: Nottingham I., *coll.? 54352* (O).—KEEWATIN: Fullerton, Hudson Bay, *J. M. Macoun 79149* (O, G); Chesterfield Inlet, *Sutton Aug.–Sept., 1930* (C); same, *J. W. Tyrrell 1717* (O); same, *Malte 120463* (O); Cape Eskimo, *J. M. Macoun 79145* (O).—S. QUEBEC: Flaherty I., Belcher Isls., *E. C. & L. B. Abbe 4104* (M, G); Tukarak I., Belcher Isls., *J. K. Doutt 203, 370* (C); same, *Abbe & Marr 4054* (M, G).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3768* (M, G); Whale I., *Abbe & Marr 3403* (M, G); Wiachewan Bay, *E. C. & L. B. Abbe 3406* (M, G); Fishing Lake Cr., *Abbe & Marr 3593, 3594* (M, G).—Along Ungava R., Aug. 18, 1896, *Spreadborough 13681* (O); Port Harrison, *Malte 127020, 127048* (O, G), *120745* (O); same, *Polunin 2233* (G); Wolstenholm, *Malte 120976* (O); opposite Digges I., *Low 54353* (O); Wakeham Bay, *Polunin 1380* (O); Diana Bay, *Dutilly, O'Neill & Duman 87125* (G); Payne Bay, *Ney & Courtright 2427* (O); Ungava Bay (Ft. Chimo), *L. M. Turner 627* (G); Cape Chidley, *R. Bell 18870* (O); Burwell, *Malte 126800* (O, G), *120019, 120053* (O); same, *Oldenburg 51A* (M); same, *L. E. Borden 63042* (O).—LABRADOR: head of Main Arm of Ikordlearsuk Bay, *Woodworth 149* (G); Eclipse Harbor, *H. S. Forbes 62* (G); vicinity of Ryan's Bay, *Woodworth 150, 151, 152* (G); Valley of Bryant Lakes, Kangalaksiorvik, *Abbe 225* (O, G); Kangalaksiorvik Bay, *Bryant 63* (G); Rama, *Sornborger 177* (G); Hebron, *Wynne-Edwards 7053* (O); Cape Mugford Penins., *Abbe 224* (G); Anatolak, *Sewell 457* (G); Hopedale, *Abbe & Hogg 223* (O, G); Rodney Mundy I., Indian Harbor, *Abbe & Hogg 222* (O, G); Webeck Harbor, *Sornborger 10* (G); Salmon Bight, lat. 53° 27′, *A. E. Porsild 21* (G), *27* (O); Battle Harbor, *Waghorne 112* (A); Emily Harbor, *Waghorne* (A).—NORTHWESTERN NEWFOUNDLAND: Doctor Hill, Highlands of St. John, *Fernald, Long & Fogg 1588, 1589* (G).

9. **Salix arctica** Pall., Fl. Ross. **1**[2]: 86 (1788).

The "*S. arctica* complex," as represented in America, has long been divided into two parts, eastern and western. Its basic nomenclature has been noted for its confusion; but Rydberg in 1899 and Schneider (more fully) in 1918 seem to have straightened it out sufficiently for the time being. There is no need to go into it here, but reference may be made to Schneider in Bot. Gaz. **66**: 117–135 (1918) for details. The chief concern at present is whether the two supposed entities, *S. arctica* Pall. in the west and *S. anglorum* Cham. principally in the east, are actually worthy of specific distinction. Schneider, who saw a large amount of material during his monographic studies, admitted great difficulty in naming many specimens in this group. Nevertheless he maintained the two species, with the following descriptive key characters to separate them (Bot. Gaz. **67**: 33–34):

> Leaves not stomatiferous above,[18] usually obovate or obovate-oblong, rounded to subacute or plicate-acute at the apex, gradually or abruptly attenuate at the base or obtuse or sometimes rounded, the larger well-developed ones 3–6 : 2–4 cm.; petioles 9–20 mm. long; stipules on the vegetative branchlets ovate-lanceolate or lanceolate, entire or somewhat denticulate, 2–12 mm. long; aments at anthesis 2.5–4 cm. long, conspicuous with black, densely long-silky bracts, in fruit 6 : 1.3 up to 9 : 1.8 cm.; ovaries sessile or subsessile, silky-villous; styles distinct, usually entire, 2–2.5 times longer than the oblong bifid stigmas; capsules (6–) 8–10 mm. long exclusive of short pedicels ⅔ the length of the gland to scarcely shorter than the gland (very rarely a little longer) .....*S. arctica* and vars.
> Leaves stomatiferous above, usually smaller, exceedingly variable . . . petioles hardly over 10 mm. long; stipules none or smaller; aments even in fruit scarcely up to 5.5 : 1.5–1.8 cm., often distinctly smaller, more slender; capsules up to 7–8 mm. long exclusive of pedicels almost none or ½ to ⅓ the length of the glands .....*S. anglorum* and vars.

[18] "With the exception of *S. arctica* var. *subcordata*, which, however, is easily distinguished from any of the forms of *S. anglorum* by its much larger leaves and longer stouter catkins."

This key summarizes the situation rather adequately, and it will be seen at once that except for the stomate character there is scarcely anything to distinguish the two species with the possible exception of size. Schneider expressed this quite clearly as follows (Bot. Gaz. **66**: 121): "Generally, *S. arctica* is a much more robust plant with larger leaves and catkins and thicker branchlets, but when we compare the shape and pubescence of the leaves and the different characters of the flowers and fruits it is rather difficult to express in words those signs that the eye can more or less easily perceive." He therefore set great store by the presence or absence of stomata on the upper leaf-surfaces, although this failed also for one of the varieties of *S. arctica* (see footnote, above), and for forms of *S. anglorum* both in the eastern and western parts of the latter's range. Forms collected at Herschel I., though they had the other characters of *S. anglorum,* had to be placed arbitrarily in *S. arctica* because they had no stomata on the upper leaf-surfaces.

With these things in mind, Polunin (l. c.) has ventured to unite the two forms under the older name, *S. arctica* Pall., and to consider that they are at best varietally separable. My own experience bears this out, but I think it advisable to maintain some sort of taxonomic distinction for the smaller, less robust form which is common in the eastern Arctic and which is now called *S. anglorum.* The earliest varietal name for this is var. *Brownei* Anderss. The following is a key to the recognized varieties of *S. arctica.*[19]

Leaves broadly ovate, ovate-rounded, obovate, broadly elliptic to orbicular, rounded or rather short-acute at the apex, or sometimes very short-plicate-apiculate, broadly cuneate or rounded to subcordate at the base, 1.5 : 1.2 to 3.5 : 2.8 cm., the broader ones sometimes 3.5 : 3 cm., the young leaves apparently always sparsely villosulous above and pilosulous on the midrib; aments rather closely flowered .....9b. var. *kophophyllā.*

Leaves mostly ovate, elliptic, ovate-elliptic, obovate-elliptic, or rarely obovate-lanceolate, obtuse or acute at the apex, rounded or cuneate at the base, 1.5 :1 to 5 : 2.9 cm., or the narrower, more acute ones 4 : 1.8 cm.

Leaves covered with silky hairs when young; aments closely flowered; young twigs blackish, purplish or flavescent .....9a. var. *Brownei.*

Leaves usually glabrous from the beginning; aments rather loosely flowered toward the base; twigs much elongated, yellowish .....9c. var. *araioclada.*

9a. **Salix arctica** var. **Brownei** Anderss. in DC. Prod. **16**[2]: 286 (1868).—*Salix arctica* Pall., Rydberg in Bull. N. Y. Bot. Gard. **1**: 266 (1899), as to *Bell 18825* (O), from Hudson Str.; Grøntved in Rept. 5th Thule Exp. **2**: 32 (1936); Polunin in Nat. Mus. Can. Bull. **92**: 157 (1940).—*S. arctica* R. Br., Macoun, J., Cat. Can. Pl. **1**[3]: 444 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88**: 70J (1889), **1895**: 361L (1897), **1898**: 36M (1901).—*S. Brownii* Bebb in Bot. Gaz. **14**: 115 (1889); Macoun, J., Cat. Can. Pl. **2**[5]: 356 (1890); Tyrrell in Geol. Surv. Can. Ann. Rept. **1896**: 213F (1898).—*S. anglorum* Cham., Rydberg in Bull. N. Y. Bot. Gard. **1**: 266 (1899), in part; Fernald in Ott. Nat. **13**: 98 (1899); Schneider in Bot. Gaz. **66**: 126 (1918), in Jour. Arn. Arb. **3**: 67 (1921); ? St. John in Victoria Mem. Mus. Mem. **126**: 79 (1922); Wetmore in Rhod. **25**: 8 (1923); Raup in Mem. Carn. Mus. **12**[3]: 22 (1936), in part; Abbe in Rhod. **38**: 147 (1936).

Variety *Brownei* is widespread in the eastern Arctic (cf. Polunin, l. c.). It is apparently common throughout the Archipelago and west along the arctic coast of the continent at least to Cape Bathurst. In the Hudson Bay district it reaches its known southern limits near Cape Eskimo on the west coast (cf. Grøntved, l. c.) and at Port Harrison on the east coast. On the outer Labrador it is known only as far south as Hopedale, lat. 55° 27′.

[19] Modified from Schneider's key in Bot. Gaz. **66**: 126–134 (1918).

SPECIMENS EXAMINED: KEEWATIN: Southampton I., *Sutton,* several specimens collected *July 2, 3, 10, 30, 1929–30* (C); same, *Oldenburg 188B* (M); Fullerton, lat. 64°, *L. E. Borden 63050* (O); Chesterfield Inlet, *Sutton Aug.–Sept., 1930* (C); same, *Malte 120416* (O); same, *Freuchen 734* (O).—N. QUEBEC: Port Harrison, *Malte 127034, 127039* (O, G), *120867* (O); Smith I., *Malte 120882, 120889, 120901, 120903, 120915, 120917* (O); opposite Digges I., *A. P. Low 23037* (O, A); Nottingham I., *R. Bell 24623* (O); Sugluk, *Oldenburg 157C* (pt.) (M); Wakeham Bay, *Malte 118617, 120222, 120234, 120253* (O); Prince George Sd., *R. Bell 18785a* (O); Diana Bay, *Ney & Courtright 2402* (O); Ungava Bay (Ft. Chimo), *L. M. Turner 4817* (G); Port Burwell, *Malte 126798, 126803, 126804, 126816, 126835, 126819, 126820* (O, G).—LABRADOR: head of Main Arm of Ekortiarsuk Bay, *Woodworth 153* (G); Eclipse Harbor, *H. S. Forbes 82* (G); Kangalaksiorvik Bay, *Bryant 81, 84, 85, 86, 87* (G); Valley of Bryant Lakes, Kangalaksiorvik, *Abbe 232* (G); 20 mi. N. of Nachvak, *H. S. Forbes 83* (G); Bishop's Mitre, Kaumajet Mts., *Abbe 233* (O, G); Hebron, *Mrs. G. K. Tallman July 20, 1936* (M); Hopedale, *Abbe & Hogg 227* (G).

9b. **Salix arctica** var. **kophophylla** (Schneider) Polunin in Jour. Bot. **77:** 271 (1939), in Nat. Mus. Can. Bull. **92:** 157 (1940).—*S. anglorum* Cham. var. *kophophylla* Schneider in Bot. Gaz. **66:** 130 (1918), in Jour. Arn. Arb. **3:** 67 (1921); Woodworth in Rhod. **29:** 56 (1927); Abbe in Rhod. **38:** 147 (1936).

When originally described by Schneider this variety was known only in the Gaspé region and Newfoundland; but it has since been collected on the outer Labrador coast at several points, and Polunin gives it a rather wide range in the more southern arctic islands. Polunin also cites specimens from various points in northern Quebec and Labrador, and one from Chesterfield Inlet collected by *Malte* (*120566,* O) which I believe is *S. arctophila.*

SPECIMENS EXAMINED: N. QUEBEC: Port Harrison, *Malte 120760, 120817, 120820* (O); Cape Smith, *Polunin 1301* (O), *1349* (G); Prince George's Sd., *R. Bell 18785b* (O); Port Burwell, *Malte 118598, 120005, 120170, 120172* (O); same, *Polunin 1101* (O).—LABRADOR: Valley of Bryant Lakes, Kangalaksiorvik, *Abbe 231* (O, G); head of Nachvak Bay, *Woodworth 154* (G); Battle Harbor, *Abbe 226* (G).

9c. **Salix arctica** var. **araioclada** (Schneider) comb. nov.—*S. anglorum* Cham. var. *araioclada* Schneider in Bot. Gaz. **66:** 133 (1918), in Jour. Arn. Arb. **3:** 67 (1921); Abbe in Rhod. **38:** 147 (1936).

Known in our region only from two collections in northern Labrador. Like var. *kophophylla,* it had only a limited known range in the northeast (Gaspé Peninsula) when described by Schneider; but it is distinctive in this group for having representatives in the Rockies and Selkirks of Alberta and British Columbia.

SPECIMENS EXAMINED: LABRADOR: The Four Peaks, Torngat Mts., lat. 59° 25′, *Abbe 229* (O, G); Kangalaksiorvik, lat. 59° 18′, *Abbe 228* (G).

10. **Salix arctophila** Cockerell ex Heller, Cat. N. Amer. Pl. 89 (1910); Schneider in Bot. Gaz. **67:** 57 (1919), in Jour. Arn. Arb. **3:** 68 (1921); Fernald in Rhod. **28:** 178 (1926); Lewis in Can. Field Nat. **45:** 228 (1931); Abbe in Rhod. **38:** 147 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 159 (1940).—*S. groenlandica* Lundström in Nov. Act. Reg. Soc. Sci. Upsala **3:** 36 (1877); Rydberg in Bull. N. Y. Bot. Gard. **1:** 267 (1899); Schneider in Bot. Gaz. **66:** 140 (1918).

Apparently common throughout most of our region. Its southern limits appear to be on South Twin Island in James Bay, and on Newfoundland and the Gaspé Peninsula in the east. Polunin says that it is "fairly general" in southern Baffin Island, but in the northern arctic islands it is more local. It has been collected at several points on the west coast of Hudson Bay, and westward in the Great Lake region of the Mackenzie basin (cf. Raup in Jour. Arn. Arb. 17: 230, 1936). The species is rather consistent and distinctive in form, although intermediates between it and *S. Uva-ursi* or *S. arctica* var. *Brownei* are not infrequent (cf. Polunin, l. c., pp. 154, 159). Forms with glabrous capsules appear occasionally

throughout the range of the species, and are called f. *lejocarpa* (Anderss.) Fernald in Rhod. **28**: 178 (1926) (*S. arctica* γ *groenlandica* var. *lejocarpa* Anderss., DC. Prod. **16**[2]: 287, 1868).

SPECIMENS EXAMINED: FRANKLIN: ? Cape Dorset, Baffin I., *Oldenburg 170A* (pt.).—KEEWATIN: South Bay, Southampton I., *Sutton June 27, July 20, 1929–30* (C) (cited under *S. anglorum* in Raup, Mem. Carn. Mus. **12**[3]: *22*); same coll. and locality, *July 10, Aug. 2, 1929–30* (C) (cited under *S. cordifolia* var. *callicarpaea* in Raup, l. c.); Chesterfield Inlet, *Polunin 2148* (pt.) (O), *90, 1764, 2237* (G); same, *Malte 120566* (O); same, *Gardner 355* (G); between L. Athabaska and Chesterfield Inlet (Dubawnt L.), *Tyrrell 18834* (O).—MANITOBA: Churchill, *J. M. Macoun 79168* (O, G); same, *Gardner 41* (A); west coast of Hudson Bay, lat. 57°, *J. M. Macoun Aug., 1886* (A).—ONTARIO: South Twin I., James Bay, *M. T. Doutt 2268, 2321, 2394, 2397* (C); same, *J. M. Macoun 18827* (O).—S. QUEBEC: Island near mouth of Seal R., Cape Jones, *Abbe & Marr 4126* (M, G); near Great Whale R., *Spreadborough 54354* (O); same, *Low 63269* (O), *63271?* (O); Bill of Portland I., *M. T. Doutt 2645* (C).—Belcher Isls.: Tukarak I., *Abbe & Marr 4081* (M, G); same, *J. K. Doutt 12, 329* (C).—Richmond Gulf: *Spreadborough 54355* (O); mainland S. of Cairn I., *Abbe & Marr 4264, 4265* (M, G); Beach Cr., *Abbe & Marr 3271* (M, G); Cairn I., *Todd July 31, 1926* (C); same, *Abbe & Marr 3028, 3029, 3487* (M, G).—Nastapoka R., *Murie July 6, 1915* (C); along Ungava R., Aug. 6, 1896, *Spreadborough 13687b* (O); Port Harrison, *Malte 127016* (O, G); same, *Todd June 12, 1930* (C); same, *Oldenburg 230A* (pt.) (M); Cape Smith, *Oldenburg 212A* (M); northern Ungava, *Low 24774* (O); Erik Cove, Hudson Str., *Low 23039* (O); Digges I., *R. Bell 18825* (O); Sugluk, *Oldenburg 157C* (pt.) (M); Sugluk West, *Polunin 1536* (O); Cape Prince of Wales, *R. Bell 18831* (O); Port Burwell, *Malte 126775* (O, G), *120007, 120013, 120023, 120074, 120124, 120126* (O).—LABRADOR: Bowdoin Harbor, *Sewell 129* (G); Eclipse Harbor, *Dutilly, O'Neill & Duman 87001* (G); head of Main Arm of Ekortiarsuk Bay, *Woodworth 161* (G); Razorback Mt., Ryan's Bay, *Woodworth 157* (G); Northwest Bank, at head of Ryan's Bay, *Woodworth 155, 156* (G); Kangalaksiorvik, *Bryant 77, 79* (G); 20 mi. N. of Nachvak, *H. S. Forbes 78, 80* (G); head of Nachvak Bay, *Woodworth 158* (G); Big I., Saglek Bay, *Gardner 193* (G); Kikkertaksoak I., Saglek Bay, *Woodworth 159* (G); head of North Arm of Saglek Bay, *Woodworth 160* (G); Hebron, *Oldenburg 5* (M); same, *Polunin 1014* (pt.) (O); same, *Wynne-Edwards 7094* (O); Cape Mugford, *Todd Aug. 2, 1920* (C); mouth of Fraser R., lat. 57°, *Bishop 237* (G); 15 mi. W. of Nain, *H. S. Forbes 91* (G); Ford Harbor, *R. Bell 18833* (O); Anatolak, *Sewell 460* (G); Cape Harrigan, lat. 55° 50′, *Bishop 238* (G); Windy Tickle, lat. 55° 45′, *Bishop 239* (G); Hopedale, *Sornborger 2* (G); same, *Bishop 240* (O, G); Webeck Harbor, *Sornborger 5* (G); Turnavik, *J. M. Macoun 79158* (O, A); same, *A. E. Porsild 90, 91, 92* (O); Indian Harbor, *Bishop 241* (G); Rodney Mundy I., Indian Harbor, *Abbe & Hogg 235* (G); Cut Throat I., *Dutilly, O'Neill & Duman 7201* (G); Gready I., *H. S. Forbes 76* (G); Salmon Bight, lat. 53° 27′, *A. E. Porsild 33* (O, G), *32* (O); Winter Harbor, *Gardner 114, 216* (G); Battle Harbor, *Gardner 62* (pt.), *99* (G); same, *Abbe 234* (O, G); same, *Townsend 19* (G); same, *Bishop 242* (G); same, *Waghorne 4* (A); same, *M. T. Doutt 3033* (C); Cartridge Bay and Seal Islands, *Waghorne 13* (pt.) (O); Long Tickle, *Townsend 32;* Holton, *Waghorne 69* (A); W. branch of Hamilton R., *Low 6050* (O); Grand Falls, Hamilton R., *M. T. Doutt 3372, 3375* (C); L. Petitsikepau, *Low 6049* (O).—S. QUEBEC & NEWFOUNDLAND: Boat Harbor, Nfld., *Fernald, Wiegand & Long 27965* (G); Flower Cove, Nfld., *Fernald, Long & Dunbar 26579, 26580* (G); same, *Fernald, Griscom & Gilbert 27956* (G); same, *A. G. Huntsman Sept. 2, 1923* (G); Archipel du Petit Mecatina, *St. John 90843, 90844* (O, G); Pte. du Sud-ouest, Anticosti, *Victorin & Rolland 27769* (O, G); same, *John Macoun 18818* (O).

11. **Salix hudsonensis** Schneider in Bot. Gaz. **67**: 57 (1919), in Jour. Arn. Arb. **3**: 69 (1921); Polunin in Nat. Mus. Can. Bull. **92**: 161 (1940).—*S. fullertonensis* × *groenlandica* Schneider in Bot. Gaz. **66**: 342 (1918).

Apparently confined to the Hudson and James Bay regions and the central arctic coast. It has been collected most commonly about the north and northwest shores of Hudson Bay. As indicated above, Schneider first designated this group of plants as hybrids of *S. arctophila* (*S. groenlandica*) and his newly described *S. fullertonensis*. Later he saw more material, notably the Preble specimens cited below, and decided to set up a new species to cover the lot. He

considered it most nearly related to *S. arctica* var. *Brownei* (*S. anglorum*) and *S. arctophila,* particularly to the latter, from which it differs in its shorter pedicels and more elongated glands. I have had no experience with it in the field, but Polunin (l. c.) says that he has continually failed to recognize it while collecting, even though he has found it amply represented in his collections. Like Polunin, therefore, I am retaining it as a separate species with hesitation, in view of its lack of distinctness in the field and of its apparent "intermediate" nature. Its proper designation must await the accumulation of more specimens and field notes (see note under *S. fullertonensis*).

SPECIMENS EXAMINED: KEEWATIN: Roes Welcome, S. of Wager Bay, *Freuchen 691* (O) (see note under *S. fullertonensis*); Fullerton, *J. M. Macoun 79148* (O), *79167* (O, N, G); Chesterfield Inlet, *Malte 120466, 120492* (O, N), *120483, 120486, 120517, 120543* (O); same, *Polunin 2146* (G), *2199* (O); ? Rankin Inlet, *J. M. Macoun 79162* (G); 50 mi. S. of Cape Eskimo, *Preble & Preble 43* (TYPE), *46* (A, photos).—ONTARIO: Barren shores of Hudson Bay, lat. 55–56°, *J. M. Macoun 18822* (O); mouth of Albany R., James Bay, *Spreadborough 62618* (O, A, photo).

Since this species is commonly unrecognized by collectors and needs much further study, it is worth while to mention a few other specimens that have been cited. Schneider gives the following[20]: 25 mi. S. of Cape Eskimo, *Preble & Preble 54, 57* (W); Nottingham I., *R. Bell 54358* (O); Digges I., *R. Bell 54359* (O); Mansfield I., *R. Bell 54360* (O); Katur Pt., Bathurst Inlet, *R. M. Anderson 93775* (O). Polunin cites: South Bay, Southampton I., *Malte 120687* (O, N); Wolstenholm, *Polunin 1934;* Whale Pt., *Comer 1893* (K); ? Chesterfield, *Freuchen 733* (C) (under *reptans* in Grøntved, Rept. 5th Thule Exp. **2**: 34).

12. **Salix glauca** L., Sp. Pl. **2**: 1019 (1753); Macoun, J., Cat. Can. Pl. **1**[3]: 448 (1886), in part; Macoun, J. M. in Geol. Surv. Can. **1887–88**: 70J (1889), in part, **1895**: 362L (1897), in part, **1898**: 36M (1901), in part; Størmer in Nyt. Mag. f. Naturv. **32**: 266 (1933), in part; Polunin in Nat. Mus. Can. Bull. **92**: 162 (1940), in part.—*S. glauca* L. var. *glabrescens* (Anderss.) Schneider in Bot. Gaz. **66**: 329 (1918), in Jour. Arn. Arb. **3**: 69 (1921), in part.

It is unnecessary to review the evidence for the existence, in America, of the true *S. glauca* (see Raup in Rhod. **33**: 241, 1931; and Polunin, l. c.). Although Schneider did not admit its presence here and Rydberg gave it a very limited and sporadic occurrence, Coville (in Proc. Wash. Acad. Sci. **3**: 321, 1901) found it well represented in Alaska. In 1931 I pointed out (l. c.) that much material from the subarctic parts of the northern Great Plains, variable though it is, cannot be separated from the also variable European *glauca,* and that it matches a great deal of the northern Cordilleran material designated by Schneider as var. *glabrescens.* Since then Polunin (l. c.) has included a few specimens from the Eastern Arctic in *S. glauca,* stating that he has also noted some from "slightly to the south" of his area. Polunin's concept of *S. glauca,* as he applied it in the Eastern Arctic, however, is a very broad one, apparently including var. *acutifolia* as it was interpreted by Schneider, as well as the latter's var. *glabrescens.*

Judging by the collections that I have seen, *S. glauca* is represented in our region most frequently by var. *acutifolia* (Hook.) Schneider. Nevertheless, a few specimens from the eastern coast of Hudson Bay and from James Bay,

[20] The herbaria indicated by Schneider and Polunin in these citations are as follows: W—United States National Herbarium; K—Herbarium of the Royal Botanic Gardens, Kew; C—Botanical Museum, Copenhagen; others as in the present paper.

notably those collected by Dr. & Mrs. Abbe and J. Marr, have the obovate-oblanceolate obtuse leaves of typical *S. glauca* and closely resemble those I have collected in the Mackenzie basin. In addition to these forms, Polunin has erected a var. *stenolepis* for certain plants from southern Baffin and Southampton Island (see below).

Willows representing the typical *S. glauca* of northern Europe, and others of "*glauca*-like" nature, are so common and wide-ranging in boreal America that it will be useful to review briefly the whole series in order to "place" the region with which this paper deals (cf. Raup in Bot. Rev. **7**: 175–177, 1941). Typical or near-typical *S. glauca* occurs chiefly in western arctic and subarctic Canada, Alaska, and the northern Cordillera. On the basis of leaf shape and pubescence it can be divided into varieties with moderately well-defined ranges: vars. *acutifolia, poliophylla, ovalifolia,* and *glabrescens* (the last in Schneider's sense only in part). *Salix desertorum* Rich., a plant of somewhat doubtful status, probably also belongs with these near-typical forms (cf. Raup in Rhod. **33**: 242). I have already noted the occasional appearance of such forms in the Eastern Arctic, and it should be noted that the Abbe and Todd collections from the east coast of Hudson Bay appear to extend the range of *S. glauca* in the more strict sense somewhat to the eastward.

In the Eastern Arctic and on the northeastern mountains is a large group of forms that has been set off as *Salix cordifolia* Pursh. These plants look very much like *glauca* and were not segregated from it specifically by many earlier students of American willows. They are usually low or depressed shrubs with leaves shorter and broader than those of *S. glauca,* even to heart-shaped. Several varieties have been defined in this complex (cf. Fernald in Rhod. **28**: 181, 1926): vars. *typica, callicarpaea, intonsa, Macounii, eucycla, tonsa* (see below). Most of these are based on differences of leaf shape, size, and pubescence, and some have a certain amount of geographic significance. *Salix cordifolia,* s. l., is the commonest representative of the *glauca* group in our region, and in many sections it is the only one. Another short-leaved form in Greenland was described by Schneider as *S. anamesa* (in Bot. Gaz. **66**: 348). *Salix cordifolia* can be reported only doubtfully on the west side of Hudson Bay. Specimens from just west of Chesterfield Inlet (*Tyrrell 1711*) and from Churchill (*Gardner 12, 13, 27, 28*) strongly suggest *cordifolia* var. *callicarpaea,* but I think they are better placed with *glauca* var. *acutifolia.*

A third series is recognized chiefly in the Rocky Mountains, though representatives of it extend eastward to Hudson Bay and reappear in Gaspé and on Anticosti. It appears to contain two complexes that are recognized as species, *S. brachycarpa* Nutt. and *S. pseudolapponum* von Seemen, the former with several varieties. Both of these are distinguished chiefly by their short aments (short-oblong to spherical).

Another group, though scattered geographically, is all arctic or subarctic and has a tendency to short or obsolete petioles. These are *S. chlorolepis* Fernald of the Gaspé region (also distinguished by its glabrous capsules), *S. fullertonensis* Schneider of the northern Hudson Bay region and the central arctic coast, and *S. niphoclada* Rydberg and *S. lingulata* Anderss. of the Western Arctic.

A fifth segregate is *S. MacCalliana* Rowlee (cf. Schneider in Jour. Arn. Arb. **2**: 89, 1920). It shows the widest divergence from typical *S. glauca,* growing into a tall shrub with smooth, rather leathery, distinctly dentate leaves. Its aments closely resemble those of *S. glauca.*

From the above notes and from maps given elsewhere in this paper it is seen at once that the Hudson Bay region is a meeting ground for eastern and western American representatives of the *glauca* group. From the west come *S. glauca* proper, including at least two of its variants, and *S. brachycarpa* with one of its varietal segregates. From the east comes *S. cordifolia,* represented by at least four variants. Needless to say, there is an abundance of intermediate forms in this region, many of which defy a rational classification. Polunin (l. c., p. 163) has already noted this for areas where *S. glauca* and *S. cordifolia* var. *callicarpaea* occur together; and the same may be said of more southern districts where *S. brachycarpa* must be taken into consideration. The relationship of *S. fullertonensis* to the general mêlée is not clear, since this species is itself not yet well known. Many of the citations of specimens given here must therefore be regarded as tentative, and the determinations must remain so until we have a far better understanding than we now have of the nature of the variations involved.

The following key separates the varieties of *S. glauca* as they are here recognized.

Leaves usually obtuse or rounded at the apex, elliptic to obovate or obovate-oblong, silky-pubescent when young and often rather tardily glabrate, entire .....12. *S. glauca.*
Leaves usually more acute at the apex, sometimes subacuminate, the margin often slightly and irregularly glandular-denticulate, both surfaces glabrous or commonly soon glabrate.
Stipules half-cordate-lanceolate .....12a. *S. glauca* var. *acutifolia.*
Stipules narrowly lanceolate .....12b. *S. glauca* var. *stenolepis.*

I regard the following as fairly representative of typical *Salix glauca* as we know it in northwestern America.

Specimens examined: Ontario: The Beacon, mouth of Moose R., *Spreadborough 62620(2)* (O).—N. Quebec: island near mouth of Seal R., Cape Jones, *Abbe & Marr 4144* (M, G).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3155, 3156* (M, G): Beach Cr., *Marr 3272, 4348* (M, G); Cairn I., *Todd July 31, 1926* (C); same, *Abbe & Marr 3035, 3037, 3038, 3039* (M, G); Wiachewan R., *E. C. & L. B. Abbe 3402* (M, G).—Port Harrison, *Todd June 25, 1930* (C).

12a. **Salix glauca** var. **acutifolia** (Hook.) Schneider in Bot. Gaz. **66:** 327 (1918), **67:** 60 (1919), in Jour. Arn. Arb. **3:** 69 (1921).—*S. glauca* L., Macoun, J., Cat. Can. Pl. **1**[3]**:** 448 (1886), in part; Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), **1895:** 362L (1897), in part, **1898:** 36M (1901), in part; ? Størmer in Nyt. Mag. f. Naturv. **32:** 266 (1933), in part; Polunin in Nat. Mus. Can. Bull. **92:** 162 (1940), apparently for the most part.—*S. glauca* var. *villosa* Anderss., Tyrrell in Geol. Surv. Can. Ann. Rept. **1896:** 213F (1898).—*S. villosa* Barr. var. *acutifolia* Hook., Fl. Bor.-Am. **2:** 144 (1839).

Specimens examined: Keewatin: ? west of Chesterfield Inlet, *Tyrrell 1711* (O).—Manitoba: Churchill, *J. M. Macoun 79159* (O, A, G); same, *Gardner 13* (A, G), *12, 27, 28* (pt.) (A), *383, 384, 435, 485, 487* (G); same, *Polunin 2025* (N), *2034* (G), *2073* (O).—Ontario: W. coast of Hudson Bay, lat. 56°, *J. M. Macoun 24635* (O).—N. Quebec: 5 mi. S. of Great Whale R., *M. T. Doutt 2528* (C).—Richmond Gulf: *Spreadborough 24510* (O); Cairn I., *Abbe & Marr 3481* (M, G); Wiachewan Bay, *E. C. & L. B. Abbe 3317* (M, G).—Along Ungava R., Aug. 9, 1896, *Spreadborough 13683* (O); 5 mi. S. of West Sugluk, *Malte 127012, 127004* (O); Wakeham Bay, *Malte 120220, 120231, 120233* (O).

12b. **Salix glauca** var. **stenolepis** (Floderus, in herb.) Polunin in Nat. Mus. Can. Bull. **92:** 163 (1940).

This variety was based upon a specimen collected by Malte at Lake Harbor, Baffin Island (*118812,* O). It is distinguished by having narrowly lanceolate stipules 3–6 mm. long, and by narrowly oblong bracts about 3(4) mm. long and less than 1 mm. broad. Polunin states that he has "found other material that matches it, both in southern Baffin and on Southampton Island, as well as a rather similar specimen from Mount McKinley National Park in Alaska. . . ."

He cites a specimen: South Bay, Southampton I., *Polunin,* 1936, and others collected by himself, Malte, and Johansen from Lake Harbor. I have not seen any of these specimens, but one from Lake Harbor collected by Miss Oldenburg, no. *98* (M), shows neither the narrow bracts nor narrow stipules of var. *stenolepis.* It appears to be var. *acutifolia.*

13. **Salix cordifolia** Pursh, Fl. Am. Sept. **2**: 611 (1814).

Schneider's treatment of this common and highly variable group of willows is far from satisfactory. He had only limited material, for many of the more extensive collections by Professor Fernald and his co-workers had not yet been made; furthermore, Schneider's unavoidable lack of field experience with the plants greatly hindered his understanding of them. In 1926, after two seasons' collecting in Newfoundland, Fernald published a revision of the group which has at least reduced it to some semblance of order. In the ensuing treatment I have followed Fernald's arrangement rather closely.

Salix cordifolia, s. l., although abundant throughout the eastern part of our area, is apparently rare or nonexistent on the west coast of Hudson Bay. It has been obtained from nearly all collection localities on the Labrador Peninsula, extending south to the southern end of James Bay, and west along the north shore of the Gulf of St. Lawrence to the Mingan Islands and Anticosti. It is also common in northwestern Newfoundland and on the mountains of the Gaspé Peninsula. Polunin says that it extends northward on Baffin Island to the Arctic Circle. The following is a key to the varieties, taken directly from Fernald's revision (Rhod. **28**: 182, 1926).

New branchlets and young leaves more or less densely villous or sericeous.
  Leaves of fruiting branches oval to ovate or obovate, cordate to rounded at the base, mostly 3–7 cm. long .....13a. *S. cordifolia* var. *typica.*
  Leaves of fruiting branches not cordate, if rounded at the base mostly smaller or narrower.
    Mature leaves mostly 2.5–6 cm. long, oblanceolate, oblong, elliptic or narrowly obovate.
      Leaves glabrate in maturity or merely a little silky on the nerves beneath.
        13b. *S. cordifolia* var. *callicarpaea.*
      Leaves permanently and rather densely villous .....13d. *S. cordifolia* var. *intonsa.*
    Mature leaves mostly only 1–2.5 cm. long, orbicular to short-oblong or narrowly obovate.
      Leaves elliptic, oblong or narrowly obovate, acute or acutish.
        13c. *S. cordifolia* var. *Macounii.*
      Leaves orbicular to short-oblong, rounded at the summit.
        13f. *S. cordifolia* var. *eucycla.*
New branchlets and young leaves glabrous or essentially so; leaves obovate, 2–5 cm. broad.
  13e. *S. cordifolia* var. *tonsa.*

13a. **Salix cordifolia** var. **typica** Fernald in Rhod. **28**: 182 (1926); Schneider in Bot. Gaz. **66**: 343 (1918), in Jour. Arn. Arb. **3**: 70 (1921), in part; Abbe in Rhod. **38**: 147 (1936); Polunin in Nat. Mus. Can. Bull. **92**: 164 (1940).—*S. labradorica* Rydberg in Bull. N. Y. Bot. Gard. **1**: 270 (1899), as to Labrador plant.—*S. glauca* L., of earlier Amer. auth., in part.

The typical form, marked by having leaves rounded to cordate at base, is apparently occasional throughout much of the over-all range of the species, although it does not seem to reach quite so far north or south as do the other varieties.

Specimens examined: N. Quebec: Belcher Isls.: Tukarak I., *J. K. Doutt 123* (C); Flaherty I., *Abbe & Marr 4103* (M, G).—Smith I., *Malte 120908* (O); Port Harrison, *Malte 120764* (O); Wakeham Bay, *Malte 118658* (O).—Labrador: Seven Islands Bay, Kangalaksiorvik, *Abbe 230* (O, G); Nachvak, *R. Bell 18819, 18821* (O); Battle Harbor, *Gardner July 13, 1933* (G); Henley Harbor, *A. G. Huntsman Aug. 15, 1923* (G); same, *Aug. 21, 1923* (G).—S. Quebec and Newfoundland: Greenly I., *Lewis 130706* (O); Lake

I., *Lewis 130711, 130712* (O); Ile Moutange, Mingan Isls., *Victorin & Rolland 21686* (G); Highlands of St. John, Nfld., *Fernald & Long 27978* (G); Ingornachoix Bay, Nfld., *Fernald & Wiegand 3219* (G).

13b. **Salix cordifolia** var. **callicarpaea** (Trautv.) Fernald in Rhod. **28:** 184 (1926); Lewis in Can. Field Nat. **45:** *227* (1931); Potter in Rhod. **36:** *279* (1934); Abbe in Rhod. **38:** 147 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 165 (1940).—*S. callicarpaea* Trautv. in Nouv. Mém. Soc. Imp. Nat. Mosc. **2:** 295, *t. 7* (1832).—*S. atra* Rydberg in Bull. N. Y. Bot. Gard. **1:** *272* (1899).—*S. cordifolia* Pursh, Schneider in Bot. Gaz. **66:** 343 (1918), in Jour. Arn. Arb. **3:** 70 (1921), for the most part, also as f. *atra* (Rydberg) Schneider; St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922), in part.—*S. cordifolia* f. *hypoprionota* Schneider in Bot. Gaz. **66:** 346 (1918), as to forms with serrulate-dentate leaves; St. John, l. c., in part.—*S. glauca* L., Rydberg, l. c. 271, as to Labrador plant; and also of earlier Amer. auth.

This is the commonest form of *S. cordifolia* throughout most of the latter's range. It is distinguished by its comparatively large mature leaves (2.5–6 cm. long), which are not cordate.

Specimens examined: Ontario: South Twin I., *M. T. Doutt 2370* (C).—N. Quebec: Brushy I., E. coast of James Bay, *Potter 914* (G); Pt. Comfort, James Bay, *Potter 909* (G); Little Cape Jones, *Sutton July 19, 1926* (C); island near mouth of Seal R., *Abbe & Marr 4142* (M, G); mainland at S. end of Manitounuk Sd., *E. C. & L. B. Abbe 3966* (M, G); island between Boat Opening and Schooner Opening, Manitounuk Sd., *Abbe & Marr 3884* (M, G); 5 mi. from mouth of Great Whale R., *M. T. Doutt 2582* (C); near Great Whale R., *Spreadborough 13683a* (O); Belcher Isls., Tukarak I., *Abbe & Marr 4080, 4082* (M, G); same, *J. K. Doutt 264, 122, 330, 124, 59, 60* (C); Bill of Portland I., *M. T. Doutt 2697* (C).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3461* (M, G); small island N. of Cairn I., *Abbe & Marr 3538, 3540, 3541* (M, G); Wiachewan, *E. C. & L. B. Abbe 3385, 3401* (M, G); Beach Cr., *same colls. 3303* (M, G).—? Nastapoka, *Murie June 16, 1915* (C); Port Harrison, *Todd Aug. 14, 1926* (C); same, *Oldenburg 255A* (pt.) (M); same, *Malte 120755, 120822, 120774, 120812, 120705, 120766, 120767, 120773, 120762, 120701, 120703, 127053* (O), *127040* (G), *127044, 127046, 127049, 127051* (O, G); Gilmore I., lat. 59° 50′, *Dutilly, O'Neill & Duman 87452* (G); Wolstenholm, *Malte 120954* (O); Nottingham I., *R. Bell 24546* (O); Mansfield I., *R. Bell 24622* (O); northern Ungava, *Low 24775* (O); along a river in Ungava, *Low 13687a* (O); 5 mi. S. of W. Sugluk, *Malte 127002* (O), *127006, 127008, 127014* (O, G); W. Sugluk, *Polunin 1548* (O); Sugluk, *Oldenburg 157C* (pt.) (M); Wakeham Bay, *Malte 126917* (O, G), *118620, 120182, 120184, 120213, 120224, 120226, 120228, 120230, 120235, 120255, 120258, 120251, 128230* (O); same, *Polunin 1385* (G); Payne Bay, *Ney & Courtright 2411* (O).—Labrador: head of Main Arm of Ekortiarsuk Bay, *Woodworth 169* (G); head of Ryan's Bay, *Woodworth 168, 170* (G); Razorback Mt., Ryan's Bay, *Woodworth 171½* (O, G); 20 mi. N. of Nachvak, *H. S. Forbes 95* (G); Nachvak, *R. Bell 24288* (O); head of Nachvak Bay, *Woodworth 171* (G); head of N. arm of Saglek Bay, *Woodworth 167* (G); Saglek Bay, *Woodworth 172* (G); same, *Gardner 178* (G); Hebron, *Oldenburg 17, 25* (M); same, *J. D. Soper 122083* (O); same, *Polunin 1001, 1053* (O); same, *Wynne-Edwards 7051, 7052, 7060, 7095* (O); Kikkivitak I., lat. 56° 21′, *Abbe 249* (O, G); Rowsell Harbor, lat. 58° 58′, *Abbe & Odell 244* (O, G); Anatolak, *Sewell 459* (G); Flint I., near Port Manvers, *Bryant 94* (G); Nain, *Bishop 243 A & B* (G); 15 mi. W. of Nain, *H. S. Forbes 96* (G); Hopedale, *Bishop 245* (G); 15 mi. N. E. of Ford Harbor, *Bishop 244* (O, G); Ford Harbor, *R. Bell 24545* (O); Turnavik, *A. E. Porsild 89, 93, 129, 130* (O); Gready I., *Bryant 90, 92, 93* (G); same, *Bishop 246* (O, G); same, *Abbe & Hogg 241* (O, G); same, *Gardner 244, 245* (G); Gready Harbor, *J. D. Soper 111432* (O); Indian Harbor, *Bryant 98, 99* (G); same, *Bishop 247* (G); same, *Wetmore 102923* (O); Cartwright, *Woodworth 173* (G); Salmon Bight, *A. E. Porsild 29, 30, 31* (O); Battle Harbor, *Abbe 240* (O, G); same, *Bishop 248 A & B* (G); same, *Gardner 56, 60, 106* (G); same, *Waghorne 91, 94, 95* (A, photos), *21* (A); same, *Todd July 14, 1920* (C); same, *M. T. Doutt 3032* (C); Seal Islands, *Waghorne 18829* (O); Turner's Head, *Waghorne 50, 51, 86* (A, photos); Pack's Harbor, *Waghorne 18* (A); Red Bay, *Sornborger 7* (G); same, *Bowdoin Coll. Exp. 291* (G); same, *A. G. Huntsman Aug. 23 and Sept. 6, 1923* (G); Big Bight, *Sornborger 4* (G); Dumpling Harbor, *B. P. Mann July 17, 1864* (G); Chateau Bay, *Bowdoin Coll. Exp. 78* (G); Winter Harbor, *Gardner 121* (G); Forteau, *Fernald & Wiegand 3212* (G); Muskrat L., on portage to Grand Falls,

Hamilton R., *M. T. Doutt 3377* (C).—S. Quebec and Newfoundland: Bradore Bay, *Lewis 130707* (O); Blanc Sablon, *Fernald & Wiegand 3223, 3225, 3226* (G); same, *M. T. Doutt 3003* (C); same, *Lewis 130704* (O); Greenly I., *Lewis 130705* (O); Brest, *St. John 90845* (O, G); St. Augustin, *Lewis 130708* (O); St. Mary's Archipelago, Long. 59° 38′, *Abbe 1109, 1115* (G); same, *Lewis 130709, 130710* (O); Oupitagone Archipelago, *St. John 90842* (O, G); Caribou Isls., *Martin 4* (G).—Mingan Isls.: Ile Moutange, *Victorin & Rolland 21688, 21690* (G); Ile Ste. Genevieve, *St. John 90838, 90839, 90840* (O, G); same, *Victorin & Rolland 18910, 21698* (G); same, *Lewis 130713* (O); Ile St. Charles, *Victorin & Rolland 18913, 18916, 18929, 25922* (G); Ile Nue, *same colls. 25188, 25925* (G), *25187* (O); Ile Marteau, *St. John 90835, 90836, 90837, 90846* (O, G); same, *Victorin & Rolland 18924, 18925, 18930* (G); Ile Quin, *same colls. 18911, 18927* (G); Ile a Bouleau, *same colls. 18922* (G); Ile a la Vache Marine, *same colls. 18923, 18926* (G).—Anticosti: Pte. du Sud-ouest, *Victorin & Rolland 27765* (G); Baie St. Claire, *Victorin 4349, 4350, 4351* (G).

13c. **Salix cordifolia** var. **Macounii** (Rydberg) Schneider in Bot. Gaz. **66:** 347 (1918), in Jour. Arn. Arb. **3:** 70 (1921); Fernald in Rhod. **28:** 186 (1926); Lewis in Can. Field Nat. **45:** 228 (1931); Abbe in Rhod. **38:** 148 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 165 (1940).—*S. Macounii* Rydberg in Bull. N. Y. Bot. Gard. **1:** 269 (1899).

This variety extends northward to Hudson Straits (cf. Polunin, l. c.), and southward to western Newfoundland and Gaspé. It is known on the east coast of Hudson Bay and in James Bay, but not on the west coast.

Specimens examined: Ontario: South Twin I., *J. M. Macoun 24513* (O).—N. Quebec: Jones R., Little Cape Jones, *Todd July 17, 1926* (C); northern Ungava, *Low 24769* (O).—Labrador: Valley of the Bryant Lakes, Kangalaksiorvik, *Abbe 246* (G); head of North Arm of Saglek Bay, *Woodworth 166½* (G); Kikkertaksoak, Saglek Bay, *Woodworth 166* (G); Hopedale, *Sornborger 1* (G); Indian Harbor, *Abbe & Hogg 242* (O, G); Red Bay, *A. G. Huntsman Sept. 6, 1923* (G); ? Henley I., *same coll. Sept. 7, 1923* (G); Henley Harbor, *same coll. Aug. 15, 1923* (G).—S. Quebec and Newfoundland: Quirpon Harbor, Nfld., *A. G. Huntsman Sept. 8, 1923* (G); St. Anthony, Nfld., *Abbe 238, 239* (O); Flower Cove, Nfld., *Fernald, Long & Dunbar 26571* (G); same, *Fernald & Long 27990* (G); same, *A. G. Huntsman Sept. 2, 3, 1923* (G); Cape Norman, Nfld., *Wiegand, Griscom & Hotchkiss 27987, 27988* (G); Caribou I., *Martin 2* (G); Eskimo Pt., *C. W. Townsend June, 1909* (G); Wolf Bay, *Lewis 130698, 130699, 130700, 130701* (O); Lake I., Long. 60° 3′, *Abbe 1107, 1119* (G); same, *Lewis 130697* (O).—Mingan Isls.: Ile Nue, *Victorin & Rolland 25182, 25183, 25184, 25932* (G), *25185, 25186* (O, G); Ile Ste. Genevieve, *same colls. 18931* (G); Ile a la Proie, *same colls. 21703* (G); Ile a la Vache Marine, *same colls. 18915, 18932* (G); Ile St. Charles, *same colls. 25300* (O, G).

13d. **Salix cordifolia** var. **intonsa** Fernald in Rhod. **28:** 185 (1926); Lewis in Can. Field Nat. **45:** 228 (1931); Abbe in Rhod. **38:** 147 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 165 (1940).

Variety *intonsa* is a large-leaved form similar to var. *callicarpaea*, but with the leaves permanently villous. Like var. *Macounii*, it turns up occasionally on the Labrador Peninsula, and it has been found on South Twin I. in James Bay. It is also known in southeastern Baffin I. (cf. Polunin, l. c.). Polunin states that var. *intonsa* occurs at Churchill, but I have seen no specimens from the west coast of Hudson Bay. It apparently does not extend west of Wolf Bay on the north shore of the Gulf of St. Lawrence.

Specimens examined: Ontario: South Twin I., James Bay, *M. T. Doutt 2460* (C).—N. Quebec: Port Harrison, *Malte 127031* (O, G).—Labrador: head of Ryan's Bay, *Woodworth 162½, 163* (G); head of Nachvak Bay, *Woodworth 164, 165* (G); same, *Abbe 247* (G); 20 mi. N. of Nakvak, *H. S. Forbes 100* (G); Nachvak, *Brooks 247* (O); Kikkertaksoak, Saglek Bay, *Abbe 248* (O, G); Hebron, *Oldenburg July, 1939* (M); Okkak, *Wynne-Edwards 7495* (O); Makkovik, *Stecker 3* (G); Indian Harbor, *Abbe & Hogg 243* (O, G); Turner's Head, Hamilton Inlet, *Waghorne 36* (G) (cf. citation by Fernald, l. c.); Cartwright, *Malte 119874* (O); Battle I., *Townsend 16* (G).—S. Quebec: Blanc Sablon, *Fernald & Long 28031* (G); Wolf Bay, *Lewis 130703* (O); ? Wapitagun, *Lewis 130702* (O).

13e. **Salix cordifolia** var. **tonsa** Fernald in Rhod. **28:** 187 (1926).—*S. cordifolia* f. *tonsa* (Fernald) Polunin in Nat. Mus. Can. Bull. **92:** 165 (1940).—*S. Waghornei* Rydberg in Bull. N. Y. Bot. Gard. **1:** 271 (1899), as to Waghorne specimen from Red Bay.

Polunin says that "At several points within our area [E. Arctic, south to lat. 60°] there occur specimens that on both twigs and young shoots are so nearly glabrous as to be referable to var. *tonsa* Fernald." Since no geographic range for the form could be defined, he preferred to reduce the variety to formal status. For the present, however, I think it as well to keep the various forms of *S. cordifolia* in one kind of category. To be consistent, one should perhaps reduce them all to forms, since some of the others show scarcely any better geographic segregation than does var. *tonsa*. Until they are better understood genetically, however, they may as well remain as Professor Fernald left them. In the area dealt with in this paper, var. *tonsa* has been collected only on the outer Labrador coast and at the Straits of Belle Isle. It is also known in Newfoundland and Gaspé.

SPECIMENS EXAMINED: LABRADOR: head of Nachvak Bay, *Woodworth 162* (G); Red Bay, *Waghorne 33* (A); Forteau, *Fernald & Wiegand 3213, 3214* (G).

13f. **Salix cordifolia** var. **eucycla** Fernald in Rhod. **28:** 187 (1926).—*S. cordifolia* Pursh, St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922), in part.

This is one of the small-leaved phases of the species, but with the leaves much rounded in form. It has been collected in our region only at the Straits of Belle Isle and on the north shore of the Gulf of St. Lawrence.

SPECIMENS EXAMINED: Flower Cove, Nfld., *Wiegand, Pease, Long & Hotchkiss 27982* (G), *27991* (O, G); same, *Fernald, Long & Dunbar 26570* (G); Ile Metchiatik, Archipel Oupitagone, *St. John 90841* (O, G).

14. **Salix brachycarpa** Nutt., N. Amer. Sylva **1:** 69 (1843); Schneider in Bot. Gaz. **66:** 336 (1918), in Jour. Arn. Arb. **3:** 69 (1921); Potter in Rhod. **36:** 279 (1934).—*S. desertorum* Richards., Macoun, J., Cat. Can. Pl. **1**[3]**:** 448 (1886), in part; Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), in part, **1895:** 361L (1897).

Salix brachycarpa is typically a species of the Rocky Mountains and adjacent plains, but it is represented by plants in the southern parts of the Hudson Bay area, Gaspé, and Anticosti that, as Schneider stated, are inseparable "even as a variety." Much of the material in our area, however, has a tendency toward glabrescent leaves and appears to represent the var. *antimima*.

Leaves grey-pubescent above and whitish silky-villous beneath, except some of the smaller ones which are glabrate above; twigs of the current year more or less densely villous-tomentose .....14. *S. brachycarpa*.
Leaves glabrescent when mature, even beneath; twigs of the year glabrescent.
14a. *S. brachycarpa* var. *antimima*.

SPECIMENS EXAMINED: The following specimens may be regarded as typical of the species in the strict sense: N. QUEBEC: Pt. Comfort, James Bay, *Potter 905* (G).—S. QUEBEC: Anticosti: Pte. du Sud-ouest, *Victorin & Rolland 27764* (G), *27767* (O, G); Riv. Jupiter, *same colls. 24735* (O, G), *24734, 24736, 24737, 24738* (G); Jupiter R., *John Macoun 24460* (O).

14a. **Salix brachycarpa** var. **antimima** (Schneider) Raup in Rhod. **33:** 241 (1931).—*S. chlorolepis* Fernald var. *antimima* Schneider in Bot. Gaz. **66:** 339 (1918), in Jour. Arn. Arb. **3:** 69 (1921).—*S. desertorum* Richards., Macoun, J., Cat. Can. Pl. **1**[3]**:** 448 (1886), in part; Macoun, J. M. in Geol. Surv. Can. **1887–88:** 70J (1889), in part, **1895:** 361L (1897), in part.

There are many intergrading forms between this and the typical species, and it may be that it is not worthy of varietal rank. However, it appears as a common tendency in the northern parts of the range of the species—about Hudson

Bay, in the central part of the Mackenzie basin (cf. Raup, l. c.), and in the northern Rocky Mountains (cf. Raup in Contr. Arn. Arb. **6**: 146, 1934).

SPECIMENS EXAMINED: MANITOBA: Near mouth of Seal R., 40 mi. N. W. of Churchill, *Preble & Preble 41* (A, photo); Churchill, *J. M. Macoun 79156* (O, G), *79156a* (O); same, *Gardner 432* (G); same, *Polunin 44* (O), *1864* (G).—ONTARIO: South Twin I., *M. T. Doutt 2284* (C); ? The Beacon, mouth of Moose R., *Spreadborough 62620(1)* (O); Charlton I., *Potter 907* (G).—N. QUEBEC: Mt. Sherrick, *Potter 904* (G); East Pt., James Bay, *Todd June 27, 1941* (C); 9 mi. S. of East Main, *Potter 906* (G); Long Pt., S. of Akuatuk Bay, E. shore of Hudson Bay, *Todd July 19, 1914* (C); N. of Cape Jones, *Low 63272* (O, N); Port Harrison, *Malte 127026* (N, O, G).

15. **Salix fullertonensis** Schneider in Bot. Gaz. **66**: 340 (1918), in Jour. Arn. Arb. 3: 69 (1921); Polunin in Nat. Mus. Can. Bull. **92**: 162 (1940).

So far as is known, *S. fullertonensis* is endemic in the northern Hudson Bay region and the central arctic coast. Schneider, apparently correctly, places it in the multiform group centering in *S. glauca,* within which it belongs to a small series (*S. niphoclada, S. chlorolepis, S. lingulata*) distinguished by very short or obsolete petioles. From its closest relatives it is distinguished by its very small leaves and entirely prostrate habit.

SPECIMENS EXAMINED: KEEWATIN: Whale Pt., lat. 64°, *Geo. Comer 54075* (O); Fullerton, *J. M. Macoun 79164* (G, N, TYPE COLL.); same, *L. E. Borden 63043* (O, N); Chesterfield Inlet, *Polunin 2181* (O), *2197* (G); same, *L. T. Burwash 132141, 132142* (O); same, *Malte 120565* (O, N); Rankin Inlet, *J. M. Macoun 79163* (N, A, O), *79165* (O, N), *79166* (O); Cape Eskimo, *J. M. Macoun 79161* (N, G, O).

The following specimens of this rare willow were also cited by Schneider: Arctic Sound, Bathurst Inlet, *R. M. Anderson 93776* (O); ? Mansfield I., *R. Bell 24622* (O). Polunin adds the following: Sugluk, *Polunin,* 1936. He also includes some specimens cited variously by Grøntved in Rept. 5th Thule Exp. **2**: 33 (1936): "Chesterfield, Freuchen 1923 (C) ? 732 as 'S. arctica × pulchra' and 734 as 'S. arctica × reptans,' also 735 as 'S. arctica f.'"

In Grøntved's list of plants collected by the members of the 5th Thule Expedition (l. c.), the willows (determined by the Swedish salicologist, J. Enander) include some names which, if correctly applied, indicate extraordinary range extensions. Most notable of these are *S. reptans* Rupr., *S. Barclayi* Anderss., and *S. stolonifera* Cov. *Salix Barclayi* is not otherwise known east of the Rocky and Mackenzie Mts. It is principally developed in southern Alaska, the eastern Aleutians, and in the northern Rockies and Coast Ranges. *Salix stolonifera* is apparently endemic in the eastern Aleutians, southern and southeastern Alaska, and neighboring British Columbia (cf. Hultén, Fl. Aleut. Isls. 152, 1937). *Salix reptans* is a northern Eurasian species not previously reported in the New World.

I have seen only a few duplicates (in Herb. O) of the specimens cited by Grøntved, but they are all presumably in the Botanical Museum at Copenhagen, where they were seen by Dr. Polunin when he was preparing his Botany of the Canadian Eastern Arctic. For the time being, therefore, I shall defer to his judgment as to what most of these specimens actually represent, merely raising a question in one or two instances. Polunin cites the Chesterfield specimen marked "reptans" (*Freuchen 733*) under *S. hudsonensis* (see above) with no mention of another Freuchen specimen, *691,* from Roes Welcome, S. of Wager Bay. He does not mention the *"? Barclayi"* material from Churchill at all, though some *Barclayi* "hybrids" listed by Grøntved from N. Baffin are disposed of variously. *"Salix stolonifera,"* collected by Freuchen at Danish I., *259B,* is cited under *S. arctica.*

I have seen the Roes Welcome specimen, and find that in addition to the "sterile shoots, 15 cm. high; with fully developed leaves" noted by Grøntved (l. c.), it has some immature female catkins. The Chesterfield material, however, is reported to be a "fine specimen, with fully developed leaves and ripe and opened capsules." There is no indication of the stature of the latter. Freuchen's no. *691* seems to me nearest to *S. hudsonensis*. It closely resembles some of the excellent specimens of this poorly known form secured at Chesterfield Inlet by Malte.

It should be noted here that *S. reptans* Rupr., which was probably well understood by Enander, is a small prostrate species of the "*glauca* group." Its affinity was clearly stated in the original description (Ruprecht in Fl. Samojed. Cisural., in Beitrage z. Pflanzenk. des Russ. Reich. **2**: 54, 1845) and has been reiterated by many subsequent authors. Specimens from Arctic Russia in the Arnold Arboretum herbarium (collected by Enander) also bear this out. It seems not impossible, therefore, that some relative of *S. glauca* might be found in the Freuchen material, perhaps *S. fullertonensis*, in addition to *S. hudsonensis*, whose affinities are with *S. arctophila*.

16. **Salix cordata** Muhl. in Neue Schr. Ges. Naturf. Fr. Berlin **4**: 236, *t. 6, fig. 3* (1803); Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80**: 64C (1881), Cat. Can. Pl. **1**[3]: 446 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88**: 70J (1889), **1895**: 361L (1897); Schneider in Jour. Arn. Arb. **2**: 189 (1921), **3**: 72 (1921); St. John in Victoria Mem. Mus. Mem. **126**: 79 (1922); Potter in Rhod. **36**: 279 (1934).

This widespread and variable species of eastern America is known in our region only in the more southern sections—the southern end of James Bay and the north shore of the Gulf of St. Lawrence. See note under *S. lutea*.

SPECIMENS EXAMINED: ONTARIO: Bushy I., Moose R., *Potter 913* (G).—S. QUEBEC: Riv. St. Augustin, *St. John 90369* (O, G); Natashquan, *Victorin & Rolland 28098* (O, G).

17. **Salix lutea** Nutt., N. Amer. Sylva **1**: 63, *t. 19, fig. upper right* (1843); Schneider in Jour. Arn. Arb. **2**: 191 (1921), **3**: 72 (1921); Potter in Rhod. **36**: 279 (1934).

Known in our region only at the south end of James Bay and along the lower Moose R., but it is to be expected along other streams draining northward into Hudson and James Bays from the forested country. The specimens from Moose Factory collected by Todd and Gardner appear to be intermediate between *S. lutea* and *S. cordata*. They have reddish, pubescent young twigs, but the older ones are yellowish, though not so prominently so as in typical *S. lutea* of the northern Great Plains.

SPECIMENS EXAMINED: ONTARIO: Bushy I., Moose R., *Potter 912* (G); Moose Factory, *Todd June 9, 1941* (C); same, *Gardner 19, 39* (A).

18. **Salix myrtillifolia** Anderss. in Öfv. Svensk. Vet.-Akad. Förh. **15**: 132 (1858), in Proc. Am. Acad. **4**: 74 (1858); Schneider in Jour. Arn. Arb. **2**: 193 (1921), **3**: 72 (1921); Fernald in Rhod. **28**: 190 (1926); Potter in Rhod. **36**: 279 (1934).—*S. Novae-Angliae* Anderss., Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80**: 64C (1881), at least in part.

Known only in the southern parts of our region, though apparently widespread there. Its northern limits appear to be at Churchill (cf. Schneider, l. c.), Richmond Gulf, and the Straits of Belle Isle. A var. *brachypoda* has been distinguished as follows.

Leaves of the same color on both sides or only a little paler beneath ....18. *S. myrtillifolia.*
Leaves glaucous beneath .....18a. *S. myrtillifolia* var. *brachypoda.*

SPECIMENS EXAMINED (typical form): MANITOBA: Kettle Rapids, Nelson R., *Emerton July 15, 1917* (G).—ONTARIO: Charlton I., James Bay, *Potter 915* (G).—N. QUEBEC: Popp's

Pt., mainland S. of Cairn I., Richmond Gulf, *Abbe & Marr 3461A* (M, G).— S. Quebec: Blanc Sablon, *Fernald & Wiegand 3161* (G); Anticosti I.: Riv. au Fusil, *Victorin & Rolland 24731* (G), *27737* (O, G); Havre de la Patate, *same colls. 27734* (G).

18a. **Salix myrtillifolia** var. **brachypoda** Fernald in Rhod. **16**: 172 (1914); Schneider in Jour. Arn. Arb. **2**: 195 (1921), **3**: 73 (1921).

According to Fernald's original diagnosis, this variety is to be distinguished by having its leaves whitened beneath, its bracts black, and its conic-ovoid capsules sessile or subsessile. It appears in our region only on the Newfoundland side of the Straits of Belle Isle.

Specimens examined: Sacred I., Str. of Belle Isle., Nfld., *Fernald & Long 28006* (G); Doctor Hill, Highlands of St. John, *same colls. 28010* (G); Bard Harbor Hill, Highlands of St. John, *same colls. 28009* (G).

There is a record, as previously mentioned, of *S. Barclayi* Anderss. at Churchill, published by Grøntved in Rept. 5th Thule Exp. **2**: 34 (1937). This is marked "?" by Enander, who determined the willows of the collection, and it is based upon a single sterile shoot collected by Birket-Smith (*no. 1062B*). It is extremely doubtful if *S. Barclayi,* a Cordilleran and Alaskan species, is represented at Hudson Bay, and it is not impossible that the Birket-Smith specimen is *S. myrtillifolia,* whose leaves at some stages resemble those of *S. Barclayi.*

19. **Salix glaucophylloides** Fernald in Rhod. **16**: 173 (1914); Schneider in Jour. Arn. Arb. **1**: 156 (1920), **3**: 74 (1921); Lewis in Can. Field Nat. **45**: 227 (1931); Potter in Rhod. **36**: 279 (1934).

The known northern limit for this species is on the east cost of Hudson Bay near the mouth of Great Whale R. It is known also on the north shore of the Gulf of St. Lawrence as far east as Natashquan, at Lake St. John, and in Newfoundland. It has not yet been found on the west coast of Hudson Bay.

Specimens examined: Ontario: Bushy I., Moose R., *Potter 917* (G); West Pt., Moose I., *Gardner 62* (pt.) (A); Charlton I., *Potter 903* (G).—N. Quebec: 5 mi. from mouth of Great Whale R., *M. T. Doutt 2581* (C).—S. Quebec: Natashquan, *Victorin & Rolland 18892* (G); Mingan, *Lewis 130728* (O); Riv. Mingan, *Victorin & Rolland 24801, 24803, 24805* (G); Pte. aux Eskimaux, *same colls. 18921* (G).—Mingan Isls.: *same colls.,* Ile a la Proie, *18933* (G); Ile a Bouleau, *18909* (G).—Anticosti: *same colls.,* Riv. a la Patate, *21700* (G); Riv. McDonald, *21701* (G); R. L'Huile, *27755, 27756* (G); Salt L., *John Macoun 24349, 24564* (O).

20. **Salix adenophylla** Hook., Fl. Bor.-Am. **2**: 146 (1839); Macoun, J., Cat. Can. Pl. 1^3: 444 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895**: 361L (1897); Schneider in Jour. Arn. Arb. **1**: 158 (1920), **3**: 74 (1921); St. John in Victoria Mem. Mus. Mem. **126**: 79 (1922); Potter in Rhod. **36**: 279 (1934); Grøntved in Rept. 5th Thule Exp. **2**: 32 (1936).—See also Fernald in Rhod. **9**: 225 (1907).

Known within our region on the north shore of the Gulf of St. Lawrence, on the shores of James Bay, and on the southwest shore of Hudson Bay. It is reported by Grøntved (l. c.) at Churchill (a sterile specimen collected by Birket-Smith, *no. 1065A*), but I have not had access to the material, which is presumably at Copenhagen. These northern specimens appear to represent *S. adenophylla* in the strict sense, rather than the more southern forms that have been segregated by Fernald as *S. syrticola.* Schneider (l. c.) was unable to maintain this segregation.

Specimens examined: Ontario: Severn R., *J. M. Macoun 2004* (O, A, photo); Cape Henrietta Maria, *Spreadborough 62631* (O, A, photo); Bushy I., Moose R., *Potter 908* (G); The Beacon, mouth of Moose R., *Spreadborough 62630* (O, N); west shore of Moose R., opposite Ships Sand I., *M. T. Doutt 2147* (C).—N. Quebec: East Main, *A. H. D. Ross 24358* (O).—S. Quebec: Natashquan, *Townsend July 24–Aug. 10, 1912* (G).

21. **Salix pyrifolia** Anderss. in Svensk. Vetensk. Handl. **6:** 162, *t. 8, fig. 93* (1867); Schneider in Jour. Arn. Arb. **1:** 168 (1920), **3:** 74 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922); Lewis in Can. Field Nat. **45:** 227 (1931).—*S. balsamifera* Barr., Macoun, J., Cat. Can. Pl. 1^3: 445 (1886); Bebb in Bull. Torr. Bot. Cl. **15:** 121 (1888); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 361L (1897).

Southern in our region, with northern limits on the east coast of James Bay and in the Hamilton River district.

Specimens examined: N. Quebec: "Wood" I., Sheppard Isls., James Bay, *Todd Aug. 4, 1912* (C).—Labrador: Sandwich Bay, *Waghorne 3* (pt.) (A); Hawkes Harbor, E. coast of Labrador, *Agnes M. Ayre Aug., 1935* (G); Northwest River, Hamilton Inlet, *same coll. Aug., 1935* (G); Cartwright, *Malte 119900* (O); Chateau, *J. A. Allen Aug. 8, 1882* (O, G); Niger Sd., lat. 52° 12′, *Dutilly, O'Neill & Duman 7083* (G); Muskrat Falls, Hamilton R., *M. T. Doutt 3124* (C); along portage to Grand Falls, Hamilton R., *same coll. 3294* (C).—S. Quebec & Newfoundland: Mistaken Cove, Str. of Belle Isle, Nfld., *Fernald, Long & Dunbar 26559, 26560* (G); La Tabatiere, *Lewis 130723* (O); Natashquan, *Victorin & Rolland 18918, 18919* (G); same, *St. John 90370* (O, G); same, *Abbe 1114* (G); same, *Lewis 130724, 130725, 130726, 130727* (O).

22. **Salix Richardsonii** Hook., Fl. Bor.-Am. **2:** 147, *t. 182* (1839); Bebb in Bot. Gaz. **14:** 49 (1889); Macoun, J., Cat. Can. Pl. 2^5: 359 (1890); Macoun, J. M. in Can. Rec. Sci. **6:** 151 (1894), at least as to Tyrrell specimen from Chesterfield; Tyrrell in Geol. Surv. Can. Ann. Rept. **1896:** 213F (1898); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1898:** 36M (1901); Schneider in Jour. Arn. Arb. **1:** 214 (1920), **3:** 74 (1921); Størmer in Nyt. Mag. f. Naturv. **32:** 266 (1933); Grøntved in Rept. 5th Thule Exp. **2:** 35 (1936); Raup in Mem. Carn. Mus: 12^3: 22 (1936).—*S. Richardsonii* var. *McKeandii* Polunin in Nat. Mus. Can. Bull. **92:** 167 (1940).—*S. lanata* L., Macoun, J., Cat. Can. Pl. 1^3: 455 (1886), in part.

Salix Richardsonii is a species of the Western Arctic and Alaska, reaching its eastern limits in the northern and northwestern parts of our area. Judging by the small number of collections available, it is not common here, and this is born out by Polunin's observation (l. c., p. 167) that it is "generally only occasional." Polunin regards all of the Hudson Bay and eastern arctic material as a geographic variety distinguished by having its mature leaves much smaller (1–3(4) cm. long and 4–13(15) mm. broad) than in the typical form, and by usually having short, densely pilose pedicels on the capsules. This plant he named var. *McKeandii* (l. c.). In the original description of *S. Richardsonii,* drawn from material collected by Richardson at Fort Franklin in the Great Bear Lake region, no mention is made of the size of the leaves or of the presence or absence of pedicels. However, Hooker's plate shows habit sketches, presumably natural-size, of sterile and fruiting branchlets, both having leaves somewhat larger than those described for var. *McKeandii.* I have seen parts of the original Richardson material at the herbaria of the New York Botanical Garden and Harvard, all of which show the same tendency to larger leaves. Also, I have collected typical *S. Richardsonii* in the Mackenzie Mountains, where it is abundant. Coville's description of the leaves (in Proc. Wash. Acad. Sci. **3:** 315, 1901) as "3 to 6 cm. long at maturity" in the typical species is approximately correct, although some of the leaves on a sterile branchlet of the Richardson collection at the Gray Herbarium are less than 3 cm. long. With regard to the pedicels, Hooker's plate shows them nearly or entirely lacking, and such western material as I have seen bears this out.

There is in the National Herbarium of Canada a specimen collected by J. W. Tyrrell at Chesterfield Inlet on Sept. 11, 1893. On this day, the Tyrrell party was very near the mouth of the Inlet, which they reached on the 12th. The

specimen, *no. 1762,* is a short fruiting branchlet with the capsules breaking open and the leaves well-developed. In all respects (larger leaves, sessile capsules) it is a match for the typical species. In fact, it so closely resembles the habit sketch of a fruiting twig in Hooker's plate that the latter could well have been drawn from it. This must have been noted long ago by Rydberg, who wrote "typical" on the herbarium sheet. Polunin's statement that all the eastern arctic material is var. *McKeandii* must therefore be revised to allow the typical species on the northwest coast of Hudson Bay.

The nearest relative of *S. Richardsonii* is *S. calcicola,* which is common in the eastern and central parts of our region (see below). This eastern species differs in having shorter, more rounded leaves, oblong-ovate to suborbicular stipules, and undivided stigmas. It was described by Bebb, as *S. Richardsonii* var. *Macouniana,* from plants collected on South Twin Island, James Bay, and a plate published with the original description (Bot. Gaz. **14**: *pl. 9*) shows a short-pediceled capsule, with the pedicel hairy. Examination of a large series of specimens shows this last character to be rather consistent, although nothing was said of it either by Bebb or by Fernald and Wiegand, who set up *S. calcicola* as a separate species (Rhod. **13**: 251). Polunin (l. c., p. 169) cites several specimens from central and southern Baffin Island, and from the districts about Hudson Strait, as intermediates between *S. calicicola* and his var. *McKeandii* of *S. Richardsonii.* He says these intermediates are somewhat more common than his variety, and suggests that some of them may be direct hybrids.

I have not seen the type of var. *McKeandii,* but I think it should be noted that the points by which it differs from typical *Richardsonii* are those which would relate it to *S. calcicola,* i.e., shorter leaves and hairy-pediceled capsules. Polunin says nothing about the shape of the leaves of his variety, but his plate (l. c., p. 168) shows that they tend to be rounded at the base rather than tapering as in typical *Richardsonii.* This also is in the direction of *S. calcicola.* On the other hand, Polunin's plate shows divided stigmas which are characteristic of *Richardsonii.*

Thus it seems that var. *McKeandii* should be considered as nothing more than another phase of the population of intermediates between *S. Richardsonii* and *S. calcicola.* The nature of these intermediates, as in the case of other willow groups such as *arctica* and *glauca* and their allies, will remain uncertain until much more study has been made of their genetic behavior.

The following specimens, aside from the Tyrrell plant discussed above, represent such of the intermediate group as I have seen that closely resemble *S. Richardsonii.*

SPECIMENS EXAMINED: KEEWATIN: Southampton Isl., *Sutton June 26, Aug. 3, 1929–30* (C); same, *Oldenburg 188D* (M); same, *Malte 120576, 120597, 120691* (N); Chesterfield Inlet, *Tyrrell 1762* (O).

In addition to these we have a record of *S. Richardsonii* at Churchill, based upon collections made by Frits Johansen in 1929 (cf. Størmer, l. c.). I have not seen this material, and in view of the rather close relationships within the group of *S. Richardsonii* and *S. calcicola* I prefer to leave it as uncertain.

23. **Salix calcicola** Fernald & Wiegand in Rhod. **13**: 251 (1911); Schneider in Jour. Arn. Arb. **1**: 215 (1920), **3**: 74 (1921); Fernald in Rhod. **28**: 190 (1926); Abbe in Rhod. **38**: 148 (1936); Polunin in Nat. Mus. Can. Bull. **92**: 169 (1940).—*S. lanata* L., Macoun, J., Cat. Can. Pl. 1^3: 455 (1886), in part.—*S. lanata* L. var. *Macouniana* Bebb, acc. to Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88**: 70J (1889),

nomen nudum.—*S. Richardsonii* Hook. var. *Macouniana* Bebb in Bot. Gaz. **14:** 50 (1889); Macoun, J., Cat. Can. Pl. 2^5**:** 359 (1890); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 362L (1897).

Apparently common in the northern part of the Labrador Peninsula, extending northward at least to the Arctic Circle (cf. Polunin, l. c.). On the outer Labrador coast it has been collected as far south as the Mugford Peninsula, and it reappears in northwestern Newfoundland at the Straits of Belle Isle. In Hudson Bay it is common on the eastern coast south to South Twin Island in James Bay (the type locality of *S. Richardsonii* var. *Macouniana* Bebb). It appears to be sporadic on the west coast and has been collected only at Churchill and Cape Eskimo.

As noted in the discussion of *S. Richardsonii,* there are many forms that are transitional between these two species, particularly in the northern part of the Hudson Bay area. Nevertheless, in the eastern part of its range, *S. calcicola* is a distinct entity that is easily separated from its western relative. Polunin has described a var. *Nicholsiana,* which is distinguished by the following characters. It has been found only on Southampton Island.

Stipules densely glandular-denticulate; leaves usually short-ovate to orbicular-apiculate, rounded at the base or subcordate .....23. *S. calcicola.*
Stipules entire except for occasional glands toward the base; leaves obovate, tapering toward the base .....23a. *S. calcicola* var. *Nicholsiana.*

SPECIMENS EXAMINED (typical form): KEEWATIN: Cape Eskimo, *Gardner 408* (G).—MANITOBA: Churchill, *J. M. Macoun 79154* (O, G); same, *Gardner 72* (A, O).—ONTARIO: S. Twin I., James Bay, *J. M. Macoun 24625* (O, Type of *Richardsonii* var. *Macouniana* Bebb; A, photo); same, *M. T. Doutt 2265* (C).—N. QUEBEC: Long Pt., south of Akuatuk Bay, *Todd July 19, 1914* (C); Great Whale R., along coast of Hudson Bay, *Spreadborough 62015* (O); Belcher Isls. (Tukarak I.), *J. K. Doutt 1* (C); mainland at S. end of Manitounuk Sd., *E. C. & L. B. Abbe 3967* (M, G); S. side of Gulf Hazard, Richmond Gulf, *E. C. & L. B. Abbe 3846* (M, G); Nastapoka R., *Murie May 17, 1915* (C); Port Harrison, *Todd May 30, 1930* (C); same, *Malte 127027, 127029, 127042* (O, G), *120757, 120769, 127038* (O); same, *Polunin 1574* (O); same, *Oldenburg 230B, 255A* (pt.) (M); Kovik R., E. shore of Hudson Bay, lat. 61° 59′, *Low 23038* (O); along Ungava R., *Aug. 23, 1896, Spreadborough 13697* (O); Smith I., *Malte 120890* (O); Sugluk, *Oldenburg 157C* (pt.) (M); Wakeham Bay, *Malte 126905, 126909* (O, G), *120217, 120225, 120281* (O); Payne Bay, *Ney & Courtright 1823* (G), *2424* (O); Port Burwell, *L. E. Borden 63044* (O, A, photo), *63045* (O); same, *J. M. Macoun 79155* (O, G); same, *Malte 126818, 126821, 126824, 126831, 126833, 126838* (O, G), *120021* (O).—LABRADOR: head of Ryan's Bay, *Woodworth 174* (G); Kangalaksiorvik, *Bryant 75* (G); same, *Abbe 252* (O, G); Nachvak, *R. Bell 24739* (O); Rowsell Harbor, lat. 58° 58′, *Abbe & Odell 251* (G); Cape Mugford Peninsula, lat. 57° 50′, *Abbe 250* (G).—N. W. NEWFOUNDLAND: Sandy Cove, Str. of Belle Isle, *Fernald, Long & Dunbar 26564* (G); Big Brook, Str. of Belle Isle, *Wiegand, Gilbert & Hotchkiss 28015* (G).

23a. **Salix calcicola** var. **Nicholsiana** Polunin in Jour. Bot. **76:** 98 (1938), in Nat. Mus. Can. Bull. **92:** 170 (1940).

SPECIMENS EXAMINED: KEEWATIN: Southampton I., *Oldenburg 188A* (M).

24. **Salix Wiegandii** Fernald in Rhod. **35:** 243 (1933).

Apparently endemic in northwestern Newfoundland, where, according to Fernald, it grows characteristically on limestone barrens. Although not actually noted from the Straits of Belle Isle, it is included here on account of its occurrence in the vicinity, on terrain similar to that at the Straits.

SPECIMENS EXAMINED: Gargamelle Cove, Ingornachoix Bay, *Fernald, Long & Fogg 1602* (G, TYPE); Ingornachoix Bay, *Fernald, Wiegand & Kittredge 3185* (G); old Port au Choix, St. John Bay, *Fernald, Long & Fogg 1603, 1604* (G); Pte. Riche, *Fernald, Long & Fogg 1605* (G).

25. **Salix alaxensis** (Anderss.) Cov. var. **obovalifolia** Ball in Jour. Wash. Acad. Sci. **28:** 443 (1938).—*S. alaxensis* (Anderss.) Cov. in Proc. Wash. Acad. Sci. **2:** 280 (1900), **3:** 311, *t. 24* (1901), in part; Schneider in Jour. Arn. Arb. **1:** 223 (1920), **3:** 75 (1921), in part; Raup in Mem. Carn. Mus. **12**[3]**:** 22 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 171 (1940).—*S. speciosa* Hook. & Arn., Tyrrell in Geol. Surv. Can. Ann. Rept. **1896:** 213F (1898); Grøntved in Rept. 5th Thule Exp. **2:** 35 (1936).

Salix alaxensis is represented in our region only about the northwest coasts of Hudson Bay and westward in Keewatin. It is characteristically a species of Mackenzie, Yukon, Alaska, and the northern Rockies, and finds its eastern limit in our region. All of the material I have seen from Hudson Bay appears to have the broader, obovate leaves and dilated clasping petioles of the recently defined var. *obovalifolia.*

SPECIMENS EXAMINED: FRANKLIN: Vansittart I., Georgina I., *Freuchen 23* (O).—KEEWATIN: South Bay, Southampton I., *Sutton June 30, July 23, 1929–30* (C); Chesterfield Inlet, *Tyrrell 1765* (O); same, *Malte 120516* (O, N); same, *Dutilly 601, 6704* (G); same, *Polunin 2149* (G); same, *Gardner 333, 342* (G); Baker L., *Helge Bangsted 1100* (O).

26. **Salix laurentiana** Fernald in Rhod. **9:** 221 (1907); Schneider in Jour. Arn. Arb. **1:** 222 (1920), **3:** 74 (1921).

This species was originally described from plants collected on the Gaspé Peninsula and has since been found in the Mingan Islands and vicinity. Schneider cited a specimen, which I have not seen, from Blanc Sablon at the Straits of Belle Isle. It was collected by Waghorne (*no. 1,* part, *July 27, 1893,* U. S. Nat. Herb.) and was mixed on a sheet with *S. planifolia.*

SPECIMENS EXAMINED: Mingan Islands: Ile du Havre du Mingan, *Victorin & Rolland 18908* (G); Ile au Marteau, *same colls. 18917* (G).—Magpie, *same colls. 18885* (G).

27. **Salix candida** Flügge, apud Willd., Sp. Pl. **4:** 708 (1805); Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80:** 64C (1881), Cat. Can. Pl. **1**[3]**:** 446 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), **1895:** 361L (1897); Schneider in Jour. Arn. Arb. **1:** 226 (1920), **3:** 75 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 79 (1922); Lewis in Can. Field Nat. **45:** 227 (1931); Størmer in Nyt. Mag. f. Naturv. **32:** 266 (1933); Potter in Rhod. **36:** 279 (1934).

A common muskeg shrub of the more southern parts of our area. Its known northern limits are at Churchill, Richmond Gulf, and Sandwich Bay. For the most part it is rather uniform, but glabrescent-leaved forms occur which are called var. *denudata* Anderss., as follows.

Leaves, even when mature, densely subfloccose- or subfarinaceous-tomentose.
27. S. candida.
Leaves glabrescent or almost glabrous when mature .....*27a. S. candida* var. *denudata.*

SPECIMENS EXAMINED (typical form): MANITOBA: Churchill, *J. M. Macoun 79144* (O, G); same, *Polunin 2013* (G).—ONTARIO: W. shore of Moose R., opposite Ships Sand I., *M. T. Doutt 2148* (C); Charlton I., *Potter 896* (G); S. part of James Bay, *W. J. Wilson 53970* (O).—N. QUEBEC: Brushy I., E. coast of James Bay, *Potter 897* (G); East Main, *Potter 898* (G); Bay of Ft. George, *Dutilly, O'Neill & Duman 97300* (G).—Richmond Gulf: mainland S. of Cairn I., *Abbe & Marr 3163* (M, G); Kangetschoo, *Abbe & Marr 3548* (M, G); Cairn I., *Abbe & Marr 3009, 3010, 3045, 3046, 3096, 3097* (M, G).—L. Mistassini, *J. M. Macoun 24303* (O).—LABRADOR: Sandwich Bay, *A. P. Brown Aug., 1902* (G); Forteau, *Waghorne 13* (pt.) (A); same, *J. A. Allen July 31, 1882* (G); same, *Fernald & Wiegand 3189* (G).—S. QUEBEC & NEWFOUNDLAND: Flower Cove, *A. G. Huntsman Sept. 2, 1923* (G); Blanc Sablon, *Fernald & Wiegand 3180* (G); Brest, *St. John 90371* (O, G); Bradore Bay, *Lewis 130719, 130720, 130721* (O).—Mingan Isls.: Ile Nue, *Victorin & Rolland 24795* (G); Ile Quin, *same colls. 18907* (G); Ile Ste. Genevieve, *same colls. 18904, 18905* (G); Ile a Marteau, *same colls. 18903* (G); Ile a la Proie, *same colls. 21684, 21689, 21709* (G); Ile a la Chasse, *same colls. 18906, 24786* (G), *24733, 24785* (O, G); same, *St. John 90372* (O, G); Pte. aux Morts, *Victorin & Rolland 18902* (G); Ile St. Charles, *same colls. 24799* (G).—Tete-a-Perdrix, *Victorin & Rolland 24739* (G); Baie Johan Beetz,

Lewis 130722 (O); Betchewun, *Abbe 1112* (G); Eskimo Pt., *C. W. Townsend June, 1909* (G); Sugarloaf I., long. 64° 4′, *Abbe 1117* (G).—Anticosti: *Pursh* (G); Sand Top, *Victorin & Rolland 21704* (G); Pte. de l'Est, *same colls. 21691, 21705* (G); Riv. au Fusil, *same colls. 24789, 24790, 27735* (G); Baie Ellis, *same colls. 27736* (G); Riv. des Caps, *same colls. 27731* (O, G); Cap Ste. Claire, *Victorin 4347* (G); Baie Ste. Claire, *Victorin 4348* (G); Salt L., *John Macoun 100616* (O).

27a. **Salix candida** var. **denudata** Anderss., DC. Prod. **16**[2]: 278 (1868); Schneider in Jour. Arn. Arb. **1**: 227 (1920), **3**: 75 (1921); Lewis in Can. Field Nat. **45**: 227 (1931); Potter in Rhod. **36**: 279 (1934).

This variety has been collected in our area only on Anticosti and the North Shore, at the Straits of Belle Isle, and at the southern end of James Bay. Needless to say, there are plenty of intermediates between it and the typical species.

Specimens examined: Ontario: Bushy I., Moose R., *Potter 899* (G); Saw Pit I., Moose R., *Potter 893* (G); Bay W. of Pt. Comfort, *Potter 891* (G).—S. Quebec & Newfoundland: Eddies Cove Brook, Str. of Belle Isle, Nfld., *Fernald, Wiegand & Long 28024* (G); Betchewun, *Lewis 130718* (O); Pte. du Sud-ouest, Anticosti, *Victorin & Rolland 27766* (O, G).

28. **Salix cryptodonta** Fernald in Rhod. **16**: 172 (1914); Schneider in Jour. Arn. Arb. **1**: 226 (1920), **3**: 75 (1921); Fernald in Rhod. **28**: 190 (1926).

Known only in the extreme southeastern part of our area, and there only from a small number of collections.

Specimens examined: S. Quebec & Newfoundland: Burnt Cape, Pistolet Bay, Nfld., *Fernald & Long 28028* (G); Savage Cove, Str. of Belle Isle, Nfld., *Fernald & Long 28026, 28027* (G); Grande Ile, Mingan Isls., *Victorin & Rolland 21679* (G).

29. **Salix Bebbiana** Sarg. in Garden & Forest **8**: 463 (1895); Schneider in Jour. Arn. Arb. **2**: 66 (1920), **3**: 75 (1921); Potter in Rhod. **36**: 279 (1934).—*S. Bebbiana* var. *perrostrata* (Rydberg) Schneider in Jour. Arn. Arb. **2**: 71 (1920), **3**: 75 (1921); Fernald in Rhod. **28**: 190 (1926); Woodworth in Rhod. **29**: 56 (1927); Lewis in Can. Field Nat. **45**: 227 (1931).—*S. Bebbiana* var. *capreifolia* Fernald in Rhod. **26**: 123 (1924); Schneider in Jour. Arn. Arb. **2**: 72 (1920), **3**: 75 (1921) (as f. *capreifolia*); Lewis in Can. Field Nat. **45**: 227 (1931).—*S. rostrata* Richardson in Bot. App. to Franklin's Narr. Journ. Polar Sea 753 (1823); repr. 25, ed. 2, 765 (1823); Macoun, J., Cat. Can. Pl. **1**[3]: 453 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88**: 70J (1889), **1895**: 362L (1897); ? St. John in Victoria Mem. Mus. Mem. **126**: 78 (1922).

Salix Bebbiana is one of the most widespread willows in the subarctic portions of the continent. In many regions also it is one of the most abundant species, probably due to its ability to thrive in coniferous forest. In our region it is limited to the forested parts, but apparently it does not extend northward to the limit of the timber. Its known northern limits are on the lower Nelson River of northern Manitoba, about the southern end of James Bay, and in the Hamilton Inlet and River districts of Labrador.

It is with considerable hesitation that I have merged with the typical species the two varieties which commonly have been recognized in northeastern America. As Schneider has pointed out, in essential characters of flower, fruit, and fruiting habit there is remarkable uniformity throughout the range of the species from Newfoundland to Alaska. Only the little-known var. *projecta* Fernald, from western Newfoundland, seems to show any notable variation in these respects. On the other hand, the variability of leaf texture, size, shape, venation, and pubescence is notorious throughout the range. The principal variations usually recognized are glabrescent-leaved forms, with leaf surfaces nearly plane instead of somewhat impressed-reticulate above as in the typical species, and heavily pubescent-leaved forms. The first have been called var. *perrostrata,* and the

second var. *capreifolia*. As defined by Schneider, var. *perrostrata* is typically of the western Great Plains and Rocky Mountains of the United States (it was originally described by Rydberg from the Black Hills, Bull. N. Y. Bot. Gard. 2: 163, 1901). He regarded as typical the plants of most of the northern parts of the continent, from Alaska to the St. Lawrence, with the exception of extremely pubescent forms in southeastern Canada, which he regarded as f. *capreifolia*. There are, however, as Schneider emphasized, so many intermediate forms that it becomes practically impossible to separate any large number of specimens into three groups that show any real consistency within themselves. The geographic arrangement given above immediately breaks down if all glabrescent, flat-leaved forms are called var. *perrostrata,* for these turn up throughout the broad northern range of the species. In fact, as Schneider says, if Richardson's Fort Franklin specimens are regarded as the type of *S. rostrata* Rich., then the glabrescent-leaved form would become the typical species, for Richardson's material bears a strong resemblance to var. *perrostrata*.

For the present, therefore, and until we know more about what goes on genetically in this complex of forms, I am keeping them together as one species, even though it is possible to see leaf-form trends that are at least partially segregated geographically.

SPECIMENS EXAMINED: MANITOBA: Gillam, along Hudson Bay Ry., *Gardner 95* (A).—ONTARIO: Severn R., June 25, 1886, *J. M. Macoun 24636* (O); 9-mile Rapid, Abitibi R., *Potter 833* (G); Saw Pit I., Moose R., *Potter 886* (G); Hasey I., Moose R., *Potter 885* (G); N. end of Hayes I., Moose R., *M. T. Doutt 2040* (C); Ships Sand I., Moose Factory, *Gardner 28* (pt.), *77a* (A); south part of James Bay, *W. J. Wilson 53971* (O).—N. QUEBEC: East Main, *Potter 884* (G); White Beaver Portage, E. side of James Bay, *Todd June 22, 1914* (C).—LABRADOR: Sandwich Bay, *Woodworth 179* (G); sandy banks of Hamilton R., July 16, 1939, *M. T. Doutt 3190* (C).—S. QUEBEC & NEWFOUNDLAND: Big Brook, Nfld., *Fernald, Wiegand & Hotchkiss 28032* (G); Savage Cove, Nfld., *Fernald & Long 28033* (G); Eddie's Cove, Nfld., *Griscom 28034* (G); Flower Cove, Nfld., *Fernald, Long & Dunbar 26554* (G); mainland W. of Net I., old Fort Archipelago, *Lewis 130747* (O); Kegaska R., *Lewis 130750* (O); Mascanin, *Lewis 130748* (O); Tete-a-Perdrix, *Victorin & Rolland 18891, 24942, 24943, 24951* (G); Mingan, *C. W. Townsend June, 1909* (G).—Mingan Isls.: Ile Ste. Genevieve, *Lewis 130749* (O); same, *Victorin & Rolland 18920* (G); Ile aux Oiseaux, *Victorin & Rolland 24796* (O, G); Ile a la Proie, *same colls. 18936, 18937, 21707* (G).—Anticosti Isl.: Riv. des Caps, *Victorin & Rolland 27751* (O, G); Riv. Mac Donald, *same colls. 27747* (O, G), *27749* (G); Riv. du Renard, *same colls. 27753* (O, G); Riv. a la Patate, *same colls. 21659* (G); Riv. Ste. Marie, *same colls. 24939, 24940* (G); Riv. au Saumon, *same colls. 21699, 27752* (G); Havre de la Patate, *same colls. 21658, 21710, 27750* (G); Cap de l'Ouest, *same colls. 27762* (G), *27760* (O, G); Riv. a l'Huile, *same colls. 27759* (G).

30. **Salix pedicellaris** Pursh var. **hypoglauca** Fernald in Rhod. **11:** 161 (1909); Potter in Rhod. **36:** 279 (1934).—*S. pedicellaris* Pursh, Schneider in Jour. Arn. Arb. **2:** 81 (1920), in part, **3:** 75 (1921), in part.—*S. myrtilloides* L., Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80**: 64C (1881), Cat. Can. Pl. 1^3: 451 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), **1895:** 362L (1897).

In our region this plant appears to be confined to the southern and southwestern portions, with northern limits at Churchill and along the upper Hamilton River. It is, of course, much more common south of our area.

Schneider (l. c.) did not recognize the var. *hypoglauca* as worthy of distinction, but I am inclined to agree with Fernald that the widespread northern form with the under leaf surfaces glaucous is clearly separable from Pursh's typical form, which is more southern and has the leaves green on both sides (see Jour. Arn. Arb. **17**: 238, 1936).

SPECIMENS EXAMINED: MANITOBA: Churchill, *Gardner 65* (O, A).; Echimamish R., *R. Bell 24647* (O).—ONTARIO: Severn R., June 26, 1896, *J. M. Macoun 24643* (O); near Doctor's Cr., 3 mi. E. of Moosonee, *M. T. Doutt 2243, 2244* (C).—N. QUEBEC: Mt. Sherrick, *Potter 902* (G); Rupert House, *Potter 900* (G); East Main, *Potter 901* (G); L. Mistassini, *J. M. Macoun 24640* (O).—LABRADOR: along portage to Grand Falls, Hamilton R., *M. T. Doutt 3295* (C).

31. **Salix simulans** Fernald in Rhod. **32:** 112 (1930); Lewis in Can. Field Nat. **45:** 227 (1931).

Known thus far only from its type collection, made by Dr. Harrison F. Lewis at Betchewun on the north shore of the Gulf of St. Lawrence, Aug. 26, 1928 (*130746*, O, G), and Sept. 3, 1929 (*130745*, O, G).

32. **Salix humilis** Marsh., Arbust. Amer. 140 (1785); Schneider in Jour. Arn. Arb. **2:** 20 (1920), **3:** 76 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 78 (1922); Lewis in Can. Field Nat. **45:** 227 (1931); Bowman in Rhod. **34:** 52 (1932).

Salix humilis, s. l., is widely distributed in eastern United States and southeastern Canada, but it is confined to the southern and southeastern parts of the area treated in this paper. Its northern limits are near the southern end of James Bay and on the Hamilton River. Typical *humilis*, however, is known in our region only on Anticosti and the north shore of the Gulf of St. Lawrence. The more northern material appears to represent the var. *keweenawensis* Farwell, distinguished in the following key.

Leaves, including the young ones, lanceolate to elliptic or oblanceolate, usually 3.5–4 or more times longer than wide, soon glabrate .....32. *S. humilis.*
Young leaves broader, more nearly rounded, the mature ones rather broadly obovate and commonly tomentose .....32a. *S. humilis* var. *keweenawensis.*

SPECIMENS EXAMINED (typical form): S. QUEBEC: Boishébert, Baie des Moutons, *St. John 90354* (O, G); Harrington Harbor, *Lewis 130741* (O); Natashquan, *Victorin & Rolland 28096* (O, G); same, *St. John 90355* (O, G); Mascanin, *Lewis 130742, 130743* (O); E. of Matamek R., *Bowman 52, 57, 404* (G).—Mingan Isls.: Grande Ile, *Victorin & Rolland 24732* (O, G); Ile Ste. Genevieve, *Lewis 130744* (O).—Anticosti Isl.: Baie Ellis, *Victorin & Rolland 27741* (O, G); Riv. Jupiter, *same colls. 24945* (G).

32a. **Salix humilis** var. **keweenawensis** Farwell in Rep. Mich. Acad. Sci. **6:** 206 (1904); Schneider in Jour. Arn. Arb. **3:** 76 (1921), ed. footnote; Lewis in Can. Field Nat. **45:** 227 (1931); Potter in Rhod. **36:** 279 (1934).

SPECIMENS EXAMINED: N. QUEBEC: East Main, *Potter 890* (G); L. Mistassini, *J. M. Macoun 24563* (O).—LABRADOR: Northwest River, Hamilton Inlet, *M. T. Doutt 3041, 3051* (C); Muskrat Falls, Hamilton R., *M. T. Doutt 3173* (C).—S. QUEBEC: Natashquan R., *C. W. Townsend July 24–Aug. 10, 1912* (G); Seven Islands, *Lewis 130739, 130740* (O).—Mingan Isls.: Ile a la Proie, *Victorin & Rolland 18912* (G); Grande Ile, *same colls. 21702* (G).

33. **Salix discolor** Muhl. in Neue Schr. Ges. Nat. Fr. Berlin **4:** 234, *t. 6, fig. 1* (1803); Macoun, J. in Geol. Surv. Can. Rept. Prog. **1879–80:** 64C (1881), Cat. Can. Pl. **1**[3]**:** 447 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1887–88:** 70J (1889), **1895:** 361L (1897); Schneider in Jour. Arn. Arb. **2:** 2 (1920), **3:** 76 (1921); ? Potter in Rhod. **36:** 279 (1934).

Entirely authentic specimens of *S. discolor* have been collected in our region only in the extreme southeastern parts. Those from the Hamilton River, James Bay, and northern Manitoba are all sterile and must be called *S. discolor*, only provisionally. The first has rather shiny twigs and upper leaf surfaces and might better be placed with *S. planifolia.* Potter's specimen from James Bay might as well be called *S. glaucophylloides,* which occurs in that region. Bell's specimen from the Echimamish River is perhaps nearest of the three to typical *discolor.*

Among the specimens I have seen, and in the recent published lists, two varieties of *S. discolor* have been recognized in our region. These are var. *latifolia* Anderss. and var. *Overi* Ball. Both are distinguished from the typical form by their broader, commonly obovate-oblong leaves. So far as our material is concerned, I am unable to distinguish between the two, and I am accordingly taking up the older name for them, var. *latifolia*. It should be noted, however, that this is at best a rather tenuous varietal distinction, as there is an abundance of intermediate forms, and as it is doubtful whether any geographic segregation can be defined.

Leaves lanceolate to elliptic, more than 3–3.5 times longer than broad .....33. *S. discolor*.
Leaves broader, mostly 3–3.5 times longer than broad or less ..33a. *S. discolor* var. *latifolia*.

SPECIMENS EXAMINED (typical form): MANITOBA: ? Echimamish R., *R. Bell 24341* (O).—N. QUEBEC: ? Rupert House, *Potter 916* (G).—LABRADOR: ? tamarack swamp along portage to Grand Falls, Hamilton R., *M. T. Doutt 3320* (C).—S. QUEBEC & NEWFOUNDLAND: Bard Harbor Hill, Highlands of St. John, *Fernald & Long 28040* (G); Doctor Brook, St. John Bay, *Wiegand & Gilbert 28039* (G); Tete-a-Perdrix, *Victorin & Rolland 24941* (G); Seven Islands, la Grosse-Boule, *same colls. 18914* (G).—Mingan Isls.: Ile Nue, *Victorin & Rolland 24783* (G); Ile a Bouleau, *same colls. 18894* (G).—Anticosti Isl.: Crique de la Chaloupe, *Victorin & Rolland 24788* (G); Riv. Jupiter, *same colls. 24944* (G); Riv. Belle, *same colls. 27743* (G).

33a. **Salix discolor** var. **latifolia** Anderss. in Svensk. Vet.-Akad. Handl. **6:** 84 (1867); Schneider in Jour. Arn. Arb. **2:** 4 (1920), **3:** 76 (1921); St. John in Victoria Mem. Mus. Mem. **126:** 78 (1922), in part.—*S. discolor* Muhl., St. John, l. c., in part.—*S. discolor* var. *Overi* Ball, Lewis in Can. Field Nat. **45:** 227 (1931).

SPECIMENS EXAMINED: S. QUEBEC: Brouague, Riv. Shécatica, *St. John 90363* (G); Betchewun, *Lewis 130751* (O).—Mingan Isls.: Ile Ste. Genevieve, *St. John 90345* (O, G); Ile au Marteau, *St. John 90346, 90347, 90348* (O, G).—Anticosti Isl.: Riv. Belle, *Victorin & Rolland 27727* (O, G); Lac Sale, *same colls. 27757* (O, G); Riv. Vaureal, *same colls. 27728* (O, G); Riv. des Caps, *same colls. 27729* (G); Riv. MacDonald, *same colls. 27730, 27745, 27761* (G); Havre de la Patate, *same colls. 27732, 27733, 27748* (G).

34. **Salix planifolia** Pursh, Fl. Amer. Sept. **2:** 611 (1814); Schneider in Jour. Arn. Arb. **1:** 70 (1919), **3:** 77 (1921); Wetmore in Rhod. **25:** 8 (1923); Fernald in Rhod. **28:** 190 (1926); Lewis in Can. Field Nat. **45:** 227 (1931); Potter in Rhod. **36:** 279 (1934); Abbe in Rhod. **38:** 148 (1936); Polunin in Nat. Mus. Can. Bull. **92:** 171 (1940).—*S. phylicifolia* L., Bebb in Bull. Torr. Bot. Cl. **16:** 39 (1889); Macoun, J. M. in Can. Rec. Sci. **6:** 151 (1894); Tyrrell in Geol. Surv. Can. Ann. Rept. **1896:** 213F (1898); St. John in Victoria Mem. Mus. Mem. **126:** 78 (1922).—*S. chlorophylla* Anderss., Macoun, J., Cat. Can. Pl. 1^3: 446 (1886); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 351L (1897); Floderus in Arkiv f. Bot. **29A**[18]: 27 (1939).

Salix planifolia is widely distributed and apparently common throughout all of our region except the extreme north. Polunin, l. c., gives its northern limits in southern Baffin Island and at Chesterfield, and it apparently has not been found at all on Southampton Island. Westward it extends into the northern Cordillera and is abundant in the central part of the Mackenzie basin.

Floderus, l. c., has maintained that the name *S. chlorophylla* Anderss. should be used for this species. The typification of Pursh's description was done principally by a process of elimination, as Floderus says (see Schneider in Jour. Arn. Arb. **1**: 75–76, 1919), but the result is none-the-less clear. There is no other shrub known in the region that could possibly fit the description. Floderus has rested his case largely upon the habit of the plant, stating that *S. chlorophylla* has "erect, dark-brown branches, pressed together and acute-angled, and erect leaves which are somewhat strongly rolled up in their earlier stages" (p. 32), while Pursh's description calls it a divaricate shrub with very smooth ("laevigatis")

branchlets and flat shining leaves. This is quite true, as far as it goes, but *S. planifolia* is a widely dispersed, highly variable species. In growth habit it may be a large shrub 10 feet or more high at the margin of a swamp, or a dwarfed, spreading shrub growing in exposed rocky places. The form of its branchlets varies greatly along with these differences in habit and habitat, much-dwarfed forms sometimes having rather heavy, thick twigs. The leaves acquire their characteristic form ". . . patentibus planis . . . ," when they begin to mature.

SPECIMENS EXAMINED: KEEWATIN: Chesterfield Inlet, *Tyrrell 1763* (O); same, *Polunin 2244* (O); Dubawnt L., Aug. 11, 1893, *Tyrrell 1763a* (O); near W. end of Baker L., Sept. 2, 1893, *Tyrrell 1763b* (O).—MANITOBA: Churchill, *J. M. Macoun 79153* (O); same, *Polunin 2023* (O).—ONTARIO: Hayes I., 2½ mi. E. of Moosonee, Moose R., *M. T. Doutt 2019, 2178* (C).—N. QUEBEC: Dilly Dally I., E. shore of James Bay, *Potter 888* (G); Brushy I., E. coast of James Bay, *Potter 887* (G); White Beaver Portage, E. of James Bay, *Todd June 22, 1914* (C); Long Pt., S. of Akuatuk Bay, E. shore of James Bay, *Todd July 19, 1914* (C); ? Tukarak I., Belcher Isls., *J. K. Doutt 13* (C).—Richmond Gulf: mainland south of Cairn I., *Abbe & Marr 3162* (M, G); Cairn I., *Abbe & Marr 3027, 3040, 3117* (M, G); Beach Cr., *Marr 4350* (M, G).—? Nastapoka R., *O. J. Murie May, 1914* (C); Northern Ungava, Aug. 17, 1897 (near Payne Bay), *Low 24772* (O); Ft. Chimo, *J. D. Soper 122085* (O).—LABRADOR: Bowdoin Harbor, *Sewell 128* (G); head of Ryan's Bay, *Woodworth 176* (G); Kangalaksiorvik, *Bryant 73, 74* (G); valley of Komaktorvik R., *Abbe 255* (O, G); head of Nachvak Bay, *Woodworth 177* (G); Saglek Bay, *Gardner 179* (G); Hebron, *Polunin 1035* (O, G); same, *Oldenburg 34A* (M); Okkak, *Wynne-Edwards 7494* (O); Fraser R., *Bishop 249* (G); Ford's Harbor, *R. Bell 24287* (O); Nain, *Bishop 250* (G); Egg Harbor, Huntingdon I., *H. S. Forbes 72* (O, G); 15 miles W. of Nain, *H. S. Forbes 70* (G); Anatolak, *Sewell 463, 464, 465, 466, 467* (G); Aillik, lat. 55° 11′, *Abbe 254* (G); Winter Harbor, *Gardner 113* (G); Gready I., *Gardner 240* (G); same, *H. S. Forbes 71* (O, G); Rigolet, *A. M. Ayre Aug., 1935* (G); Turner's Head, Hamilton Inlet, *Waghorne 81, 82* (photos), *83* (A); The Backway, L. Melville, *Wetmore 102922* (O); Northwest River, Hamilton Inlet, *M. T. Doutt 3062* (C); meadow on S. side of Grand Falls, Hamilton R., *M. T. Doutt 3371* (C); 10 mi. above mouth of Minipi R., Hamilton R., *M. T. Doutt 3214, 3215* (C); Sandwich Bay, *Woodworth 175* (G); Cartwright, *A. M. Ayre Aug., 1935* (G); same, *Woodworth 178* (G); same, *Malte 119974* (O); Caplin Bay, *Bishop 251* (O, G); west of Modiste, *Waghorne 5* (A); Ragged I., *Townsend 38* (G); Red Bay, *A. G. Huntsman Sept. 5, 1923* (G); Forteau, *Long 28038, 28055* (G).—S. QUEBEC: Blanc Sablon, *Fernald, Wiegand & Long 28007, 28008* (G); same, *Lewis 130729, 130730* (O); Bradore Bay, *Lewis 130731* (O); Riv. a la Truite, Brest, *St. John 90357* (O, G); Pt. Jones, Brest, *St. John 90368* (O, G); Riv. Shecatica, Brouague, *St. John 90358, 90359, 90360, 90364* (O, G), *90361, 90362* (O); Romaine, *St. John 90365, 90366* (O, G); Natashquan, *Lewis 130732, 130733, 130734, 130735* (O); same, *St. John 90367* (G); Betchewun, *Abbe 1108, 1116* (G); same, *Lewis 130736* (O); Seven Islands, Pte. a la Marmite, *Victorin & Rolland 18889* (G); Pte. aux Morts, *same colls. 18890* (G).—Mingan Isls.: Ile a la Proie, *Victorin & Rolland 18935* (G).—Anticosti: Baie Ellis, *Victorin & Rolland 27740* (O, G).

35. **Salix paraleuca** Fernald in Rhod. **16**: 175 (1914); Schneider in Jour. Arn. Arb. **1**: 75 (1919), **3**: 77 (1921); Lewis in Can. Field Nat. **45**: 227 (1931).—*S. chlorophylla* × *glaucophylloides* Floderus in Arkiv f. Bot. **29A**[18]: 35 (1939).

Apparently rare. *Salix paraleuca* was originally described from material collected along Grand River, in Gaspé County, Que., and has been found in our area only on the north shore of the Gulf of St. Lawrence.

SPECIMENS EXAMINED: Red Bay, long. 58° 56′, *Abbe 1111* (G); Lake Isl., Wapitagun, long. 60° 3′, *Abbe 1110* (G); same, *Lewis 130737, 130738* (O, G).

36. **Salix pedunculata** Fernald in Rhod. **28**: 188 (1926).—*S. chlorophylla* × *glaucophylloides* Floderus in Arkiv f. Bot. **29A**[18]: 35 (1939).

Known in our region only from its type locality on the Newfoundland side of the Straits of Belle Isle.

SPECIMENS EXAMINED: Savage Cove, Nfld., *Fernald & Long 28035* (O, G, TYPE).

37. **Salix amoena** Fernald in Rhod. **28**: 189 (1926).—*S. chlorophylla* × *glaucophylloides* Floderus in Arkiv f. Bot. **29A**[18]: 35 (1939).

Known in our region only from its type locality in extreme northern Newfoundland.

SPECIMEN EXAMINED: Ha-Ha Mt., Ha-Ha Bay, Nfld., *Fernald, Wiegand, Long, Gilbert & Hotchkiss 28036* (G, TYPE).

38. **Salix pellita** Anderss. in Svensk. Vet.-Akad. Handl. **6**: 139, *t. 7, fig. 72* (excl. fig. left of *g*) (1867); Schneider in Jour. Arn. Arb. **1**: 82 (1919), **3**: 77 (1921); St. John in Victoria Mem. Mus. Mem. **126**: 79 (1922), in part; Fernald in Rhod. **28**: 190 (1926); Lewis in Can. Field Nat. **45**: 227 (1931); Bowman in Rhod. **34**: 52 (1932).

Except for one collection near the southern end of James Bay, this species is as yet unknown in our region except in the southeastern part. It is apparently common on the north shore of the Gulf of St. Lawrence, and it is to be expected throughout much of the southern part of our area, for it is known westward at least to the Lake Winnipeg region. *Salix pellita* is a rather distinctive species and is fairly stable in its characters except for a glabrescent form, f. *psila,* which has been collected in our area only in southern Labrador and in the Mingan-Natashquan region and Anticosti.

Normal leaves silky-velvety and lustrous beneath .....38. *S. pellita.*
Normal leaves glabrescent .....38a. *S. pellita* f. *psila.*

SPECIMENS EXAMINED (typical form): ONTARIO: Willow I., Moose Factory, *Gardner 21* (A).—LABRADOR: Muskrat Falls, Hamilton R., *M. T. Doutt 3172* (C); 2½ mi. from foot of Big Hill Portage, Hamilton R., *M. T. Doutt 3252* (C).—S. QUEBEC: Blanc Sablon, *Fernald & Wiegand 3182* (O, G); along Blanc Sablon R., *Fernald, Wiegand & Long 28056* (G); Pte. Jones, Brest, *St. John 90374* (O, G); Riv. St. Augustin, *St. John 90373* (O, G); Natashquan, *Victorin & Rolland 28171* (O, G); Moisie R., *Bowman 283* (G); Matamek R., *Bowman 80* (G); Mingan Isls., Ile Ste. Genevieve, *Victorin & Rolland 18934* (G).—Anticosti: Riv. a la Patate, *Victorin & Rolland 21680, 21682* (G); Riv. Vaureal, *same colls. 27738* (G); Riv. Dauphine, *same colls. 27744* (G); Crique de la Chaloupe, *same colls. 24787* (G); Jupiter R., *John Macoun 24302* (O).

38a. **Salix pellita** f. **psila** Schneider in Jour. Arn. Arb. **1**: 83 (1919), **3**: 77 (1921).

SPECIMENS EXAMINED: LABRADOR: Cartwright, *Malte 119885* (O).—S. QUEBEC: Romaine, *Lewis 130714, 130715* (O); Natashquan, *Townsend July 24–Aug. 10, 1912* (G); same, *Lewis 130716, 130717* (O); same, *Victorin & Rolland 28100* (G); Riv. Mingan, *Victorin & Rolland 24804* (O, G), *24798* (G).—Mingan Isls.: Grande Ile, *Victorin & Rolland 25076* (G); Ile a Marteau, *same colls. 18893* (G).—Anticosti: Riv. McKane, *Victorin & Rolland 27742, 27746* (G); Baie Ellis, *same colls. 27739* (G); Riv. Chicotte, *same colls. 27758* (G); Pte. du Sud-Ouest, *same colls. 27768* (G).

39. **Salix arbusculoides** Anderss. in Svensk. Vet.-Akad. Handl. **6**: 147, *t. 8, fig. 81* (1867); Schneider in Jour. Arn. Arb. **2**: 84 (1920), **3**: 78 (1921); ? Størmer in Nyt. Mag. f. Naturv. **32**: 265 (1933), as *S. argyrocarpa* f. *serrata* Flod.; Grøntved in Rept. 5th Thule Exp. **2**: 32 (1936).

Apparently rare in our region, and confined to the west side of Hudson Bay. *Salix arbusculoides* is common and widely distributed in the Yukon and Mackenzie basins and in the northern Rocky Mountains. It appears to reach its eastern limit on the west coast of Hudson Bay. I have not seen the Johansen specimen from Churchill cited by Størmer. It was determined by Floderus as "*argyrocarpa* f. *serrata*" (name only), which strongly suggests *arbusculoides;* for when the latter grows in exposed situations it is a low shrub resembling *S. agyrocarpa* in habit, and to a certain extent in leaf shape and pubescence. It can be distinguished easily, however, by its closely and finely *serrate* leaves. Furthermore, *S. arbusculoides* has been collected at Churchill, while *S. argyro-*

carpa is otherwise unknown on the west coast of Hudson Bay and is apparently rare on the east coast (see below). Polunin's specimen from Chesterfield was apparently not cited by him, and is marked "*S. fullertonensis?*" in the herbarium. It is sterile, with very small, nearly glabrous, elliptic leaves that are acute at both ends, bright green above and glaucous beneath, and distinctly glandular-crenate. Close examination of the under surfaces of the leaves shows some appressed-silky, slightly rusty pubescence which, together with the form, color, and serration of the leaves, suggests *S. arbusculoides*.

SPECIMENS EXAMINED: KEEWATIN: ? Chesterfield, *Polunin 2148* (pt.) (G).—MANITOBA: Churchill, *J. M. Macoun 79152* (O, G). I have not seen the Birket-Smith specimen (*no. 1061*) cited by Grøntved (l. c.), but it also came from Churchill, and was determined by Enander.

40. **Salix argyrocarpa** Anderss. in Svensk. Vet.-Akad. Handl. **6:** 107, *t. 6, fig. 60* (1867); Macoun, J., Cat. Can. Pl. 1[3]: 445 (1886); Bebb in Bull. Torr. Bot. Cl. **16:** 211 (1889), Gray's Man. ed. 6, 483 (1890); Macoun, J. M. in Geol. Surv. Can. Ann. Rept. **1895:** 361L (1897); Schneider in Jour. Arn. Arb. **2:** 88 (1920), **3:** 78 (1921); ? St. John in Victoria Mem. Mus. Mem. **126:** 78 (1922); Abbe in Rhod. **38:** 148 (1936).

This species has its greatest development in our region in Labrador and the eastern part of the North Shore. It has been found at Richmond Gulf and on the Ungava River, however, and has been very doubtfully reported at Churchill (see discussion under *S. arbusculoides*). Its northern limit appears to be in the Cape Chidley region of Labrador, although Polunin did not include it in his list. Southward it extends to Gaspé and the New England mountains.

SPECIMENS EXAMINED: N. QUEBEC: Richmond Gulf: *E. C. & L. B. Abbe 3386* (M, G); Wiachewan Bay, *Abbe & Marr 3345* (M, G).—Along Ungava R., Aug. 9, 1896, *Spreadborough 13662* (O).—LABRADOR: Bowdoin Harbor, *Sewell 130* (G); Valley of Komaktorvik R., lat. 59° 15′, *Abbe 245* (G); head of Nachvak Bay, *Woodworth 181* (G); mouth of Fraser R., *Bishop 252* (G); Nain, *Bishop 253* (G); same, *Wynne-Edwards 7551* (O); 15 mi. W. of Nain, *H. S. Forbes 69* (G); Anatolak, *Sewell 458* (pt.), *462;* Hopedale, *Bishop 254* (O, G); same, *A. M. Ayre Aug., 1935* (G); same, *Sornborger 171* (G); same, *Dutilly, O'Neill & Duman 7423* (G); Holton, lat. 54° 35′, *Bishop 255* (G); Rigolet, *Townsend 28* (G); Ratter's Bight, Hamilton Inlet, *Waghorne* (A); Cunningham's Cove, Hamilton Inlet, *Bowdoin Coll. Exped. 171* (G); near Muskrat Falls, Hamilton R., *M. T. Doutt 3160, 3162, 3163* (C); along portage to Grand Falls, Hamilton R., *M. T. Doutt 3292, 3293* (C); Meadow on S. side of Grand Falls, *M. T. Doutt 3376* (C); Sandwich Bay, *Woodworth 180* (G); Winter Harbor, *Gardner 115* (G); Salmon Bight, *A. E. Porsild 26* (O, G).—S. QUEBEC: Blanc Sablon, *Fernald & Wiegand 4240* (G); ? same, *St. John 90353* (O, G); ? Riv. Shécatica, Brouague, *St. John 90352* (O, G); ? Riv. St. Augustin, *St. John 90351* (O, G).—I agree with Schneider (in herb.) that the St. John specimens are somewhat doubtfully placed here. His *nos. 90351* and *90353* approach *S. pellita*.

HYBRIDS

A number of willow hybrids of varying authenticity have been reported in our region, but only a few can be discussed here. Some students who have examined the Hudson Bay and Labrador material, notably the late Björn Floderus, have not hesitated to recognize a host of hybrids among the mazes of interspecific intermediates found there. In nearly all cases there is no experimental genetic evidence to support these hybrid concepts, so that they are usually nothing more than aggregations of species "characters" that one sees in individual specimens. It is exceedingly easy to find such "hybrids" most anywhere in the genus *Salix;* a surprising number of specimens and species, if such a method were carried to its logical conclusion, would have to be called hybrids of multiple parentage.

The purely practical requirements of willow taxonomy are of course scarcely served by the method, for its nomenclature quickly becomes so cumbersome as to be unusable. This does not mean that some form of hybridization has not entered into the making of our interspecific complexes, but until there is an opportunity to examine these problems by genetic methods, it seems unnecessarily misleading and confusing to set up a great number of "inspection" hybrids.

Two rather well-known hybrids have been recognized in the Eastern Arctic. These are × *S. Waghornei* Rydberg (*S. arctica* var. *Brownei* × *cordifolia*), and × *S. Peasei* Fernald (*S. herbacea* × *Uva-ursi*). I have seen specimens of the first from Northern Ungava (*Low 24770, 24771,* O), Turnavik (*J. M. Macoun 79157,* G), and Henley Harbor (*B. P. Mann June 28, 1864,* G). *Salix Peasei* has been found near Chesterfield Inlet by Dutilly (cf. Polunin in Nat. Mus. Can. Bull. **92**: 156), and Polunin considers that a Birket-Smith specimen from Cape Eskimo which he saw at Copenhagen should be placed here also. The Birket-Smith material was called "*Salix* (*arctica* Pall. ×) *S. stolonifera* Cham." by Enander (cf. Grøntved in Rept. 5th Thule Exp. **2**: 34, 1936).

A possible hybrid of *Salix humilis* and *S. planifolia* was collected by St. John at Baie des Moutons, Boishébert (*no. 90356,* G; cf. Victoria Mem. Mus. Mem. **126**: 78). It is a sterile specimen with leaves like *S. humilis* except that they are nearly glabrous. Polunin (l. c., p. 159) lists several numbers collected in our area which he thinks "may perhaps result from hybridization of *S. arctica* with *S. arctophila*" (Burwell, *Johansen 1222, 1223,* Herb. Copenhagen; *Malte 126798,* O; *Polunin 1101, 2635.*—Wakeham Bay, *Polunin 1432, 1433.*—Chesterfield, *Polunin 2144, 2145, 2150, 2151, 2209*). I have seen only two of these numbers: Malte's *no. 126798* (O) I have placed in *S. arctica* var. *Brownei;* and Polunin's *no. 2144,* although it might be intermediate, seems to me very close to *S. arctophila.* Another Polunin number from Chesterfield (*2436,* G) was also designated *S. arctica* × *arctophila* by him, but it also I would place with *S. arctophila.* I have also seen a specimen from Southampton Island marked *S. calcicola* × *S. Richardsonii* by Polunin (his *no. 2272,* G). This seems to me nearest *S. Richardsonii.*

Two of the hybrids noted by Grøntved (Rept. 5th Thule Exp. **2**), *S. arctica* × *reptans* and *S. arctica* × *pulchra,* are both called *S. fullertonensis* by Polunin (see discussion of this species, above).

LIST OF NUMBERED COLLECTIONS OF SALIX CITED

Abbe, Ernst C., and others: 210 *reticulata;* 211, 212, 214 *vestita;* 217–221 *Uva-ursi;* 222–225 *herbacea;* 226 *arctica* var. *kophophylla;* 227 *arctica* var. *Brownei;* 228, 229 *arctica* var. *araioclada;* 230 *cordifolia* var. *typica;* 231 *arctica* var. *kophophylla;* 232, 233 *arctica* var. *Brownei;* 234, 235 *arctophila;* 238, 239 *cordifolia* var. *Macounii;* 240, 241 *cordifolia* var. *callicarpaea;* 242 *cordifolia* var. *Macounii;* 243 *cordifolia* var. *intonsa;* 244 *cordifolia* var. *callicarpaea;* 245 *argyrocarpa;* 246 *cordifolia* var. *Macounii;* 247, 248 *cordifolia* var. *intonsa;* 249 *cordifolia* var. *callicarpaea;* 250–252 *calcicola;* 254, 255 *planifolia;* 1106 *Uva-ursi;* 1107 *cordifolia* var. *Macounii;* 1108 *planifolia;* 1109 *cordifolia* var. *callicarpaea;* 1110, 1111 *paraleuca;* 1112 *candida;* 1113 *vestita;* 1114 *pyrifolia;* 1115 *cordifolia* var. *callicarpaea;* 1116 *planifolia;* 1117 *candida;* 1118 *vestita;* 1119 *cordifolia* var. *Macounii;* 1120 *Uva-ursi;* 3009, 3010 *candida;* 3027 *planifolia;* 3028, 3029 *arctophila;* 3035, 3037–3039 *glauca;* 3040 *planifolia;* 3042 *reticulata;* 3045, 3046 *candida;* 3058 *vestita;* 3085 *Uva-ursi;* 3087 *vestita;* 3096, 3097 *candida;* 3117 *planifolia;* 3155, 3156 *glauca;* 3160, 3161 *Uva-ursi;* 3162 *planifolia;* 3163 *candida;* 3183 *Uva-ursi;* 3271 *arctophila;* 3272 *glauca;* 3292 *vestita;* 3303 *cordifolia* var. *callicarpaea;* 3317 *glauca* var. *acutifolia;* 3385 *cordifolia* var. *callicarpaea;* 3386 *argyrocarpa;* 3401 *cordifolia* var. *callicarpaea;* 3402 *glauca;* 3403, 3406 *herbacea;* 3459, 3460 *reticulata;* 3461 *cordifolia* var. *callicarpaea;* 3461A *myrtillifolia;* 3481 *glauca* var. *acutifolia;* 3487 *arcto-*

phila; 3535 *vestita;* 3538, 3540, 3541 *cordifolia* var. *callicarpaea;* 3548 *candida;* 3593, 3594, 3768 *herbacea;* 3777 *vestita;* 3846 *calcicola;* 3884, 3966 *cordifolia* var. *callicarpaea;* 3967 *calcicola;* 3969 *vestita;* 3971 *reticulata;* 3983 *Uva-ursi;* 4054 *herbacea;* 4056 *Uva-ursi;* 4057 *reticulata;* 4080 *cordifolia* var. *callicarpaea;* 4081 *arctophila;* 4082 *cordifolia* var. *callicarpaea;* 4103 *cordifolia* var. *typica;* 4104 *herbacea;* 4126 *arctophila;* 4140 *reticulata;* 4142 *cordifolia* var. *callicarpaea;* 4144 *glauca;* 4185 *Uva-ursi;* 4264, 4265 *arctophila;* 4348 *glauca;* 4350 *planifolia;* 4369, 4376 *Uva-ursi.*

Bangsted, Helge: 1100 *alaxensis* var. *obovalifolia.*

Bell, Robert: 18785 *arctica* var. *kophophylla;* 18819, 18821 *cordifolia* var. *typica;* 18825, 18831, 18833 *arctophila;* 18849 *reticulata;* 18852 *Uva-ursi;* 18870 *herbacea;* 24287 *planifolia;* 24288 *cordifolia* var. *callicarpaea;* 24341 *discolor ?;* 24545, 24546 *cordifolia* var. *callicarpaea;* 24585 *lucida;* 24622 *cordifolia* var. *callicarpaea;* 24623 *arctica* var. *Brownei;* 24647 *pedicellaris* var. *hypoglauca;* 24739 *calcicola;* 24811 *vestita;* 54350, 54351, 54359 *reticulata;* 54362, 54363 *Uva-ursi.*

Bishop, Harlow: 231, 232 *vestita;* 233–236 *Uva-ursi;* 237–242 *arctophila;* 243A & B–248A & B *cordifolia* var. *callicarpaea;* 249–251 *planifolia;* 252–255 *argyrocarpa.*

Borden, L. E.: 63039 *Uva-ursi;* 63041 *reticulata;* 63042 *herbacea;* 63043 *fullertonensis;* 63044, 63045 *calcicola;* 63050 *arctica* var. *Brownei.*

Bowman, Paul W.: 52, 57 *humilis;* 80 *pellita;* 275 *lucida* var. *intonsa;* 283 *pellita;* 404 *humilis.*

Brooks, E. D.: 213, 215 *vestita;* 247 *cordifolia* var. *intonsa.*

Bryant, Owen: 63 *herbacea;* 65, 67 *Uva-ursi;* 68 *vestita;* 73, 74 *planifolia;* 75 *calcicola;* 77, 79 *arctophila;* 81, 84–87 *arctica* var. *Brownei;* 90, 92–94, 98, 99 *cordifolia* var. *callicarpaea.*

Burwash, L. T.: 132141, 132142 *fullertonensis.*

Comer, George: 54075 *fullertonensis.*

Doutt, J. K.: 1 *calcicola;* 3, 11 *Uva-ursi;* 12 *arctophila;* 13 *planifolia;* 28 *Uva-ursi;* 59, 60 *cordifolia* var. *callicarpaea;* 61 *Uva-ursi;* 84 *reticulata;* 122 *cordifolia* var. *callicarpaea;* 123 *cordifolia* var. *typica;* 124 *cordifolia* var. *callicarpaea;* 125 *reticulata;* 203 *herbacea;* 264 *cordifolia* var. *callicarpaea;* 329 *arctophila;* 330 *cordifolia* var. *callicarpaea;* 370 *herbacea.*

Doutt, M. T.: 2000 *longifolia;* 2019 *planifolia;* 2040 *Bebbiana;* 2147 *adenophylla;* 2148 *candida;* 2149 *longifolia;* 2178 *planifolia;* 2243, 2244 *pedicellaris* var. *hypoglauca;* 2265 *calcicola;* 2267 *reticulata;* 2268 *arctophila;* 2284 *brachycarpa* var. *antimina;* 2321 *arctophila;* 2370 *cordifolia* var. *callicarpaea;* 2394, 2397 *arctophila;* 2460 *cordifolia* var. *intonsa;* 2528 *glauca* var. *acutifolia;* 2532, 2543 *Uva-ursi;* 2581 *glaucophylloides;* 2582 *cordifolia* var. *callicarpaea;* 2620 *vestita* var. *erecta;* 2635 *Uva-ursi;* 2645 *arctophila;* 2682 *vestita* var. *erecta;* 2697 *cordifolia* var. *callicarpaea;* 2701 *reticulata;* 3001 *Uva-ursi;* 3003, 3022 *cordifolia* var. *callicarpaea;* 3033 *arctophila;* 3041, 3051 *humilis* var. *keweenawensis;* 3062 *planifolia;* 3124 *pyrifolia;* 3159 *lucida* var. *angustifolia;* 3160, 3162, 3163 *argyrocarpa;* 3172 *pellita;* 3173 *humilis* var. *keweenawensis;* 3190 *Bebbiana;* 3214, 3215 *planifolia;* 3252 *pellita;* 3292, 3293 *argyrocarpa;* 3294 *pyrifolia;* 3295 *pedicellaris* var. *hypoglauca;* 3320 *discolor ?;* 3371 *planifolia;* 3372 *arctophila;* 3374 *vestita* var. *erecta;* 3375 *arctophila;* 3376 *argyrocarpa;* 3377 *cordifolia* var. *callicarpaea.*

Dutilly, Père A.: 601, 6704 *alaxensis* var. *obovalifolia.*

Dutilly, Père A., H. O'Neill, & M. Duman: 7083 *pyrifolia;* 7201 *arctophila;* 7423 *argyrocarpa;* 7649 *vestita;* 87001 *arctophila;* 87125 *herbacea;* 87452 *cordifolia* var. *callicarpaea;* 87453 *reticulata;* 97300 *candida.*

Fernald, M. L., and others: 1588, 1589 *herbacea;* 1602–1605 *Wiegandii;* 3146 *lucida;* 3161 *myrtillifolia;* 3169 *Uva-ursi;* 3180 *candida;* 3182 *pellita;* 3185 *Wiegandii;* 3189 *candida;* 3199 *vestita;* 3209 *cordifolia* var. *typica;* 3212 *cordifolia* var. *callicarpaea;* 3213, 3214 *cordifolia* var. *tonsa;* 3223, 3225, 3226 *cordifolia* var. *callicarpaea;* 4240 *argyrocarpa;* 26554 *Bebbiana;* 26559, 26560 *pyrifolia;* 26564 *calcicola;* 26570 *cordifolia* var. *eucycla;* 26571 *cordifolia* var. *Macounii;* 26579, 26580 *arctophila;* 26585 *reticulata;* 27933 *lucida;* 27949 *jejuna;* 27956, 27965 *arctophila;* 27978 *cordifolia* var. *typica;* 27986 *jejuna;* 27990 *cordifolia* var. *Macounii;* 28006 *myrtillifolia* var. *brachypoda;* 28007, 28008 *planifolia;* 28009, 28010 *myrtillifolia* var. *brachypoda;* 28024 *candida* var. *denudata;* 28026–28028 *cryptodonta;* 28031 *cordifolia* var. *intonsa;* 28032, 28033 *Bebbiana;* 28035 *pedunculata;* 28036 *amoena;* 28042 *discolor;* 28056 *pellita.*

Forbes, H. S.: 62 *herbacea;* 64, 66 *Uva-ursi;* 69 *argyrocarpa;* 70–72 *planifolia;* 76, 78, 80 *arctophila;* 82, 83 *arctica* var. *Brownei;* 91 *arctophila;* 95, 96, *cordifolia* var. *callicarpaea;* 100 *cordifolia* var. *intonsa.*

FREUCHEN, PETER: 23 *alaxensis* var. *obovalifolia;* 691 *hudsonensis;* 734 *arctica* var. *Brownei.*

GARDNER, G.: 12 *cordifolia* var. *callicarpaea;* 13 *glauca* var. *acutifolia;* 21 *pellita;* 22 *lucida* var. *angustifolia;* 27 *cordifolia* var. *callicarpaea;* 28 (pt.) *Bebbiana;* 28 (pt.) *glauca* var. *acutifolia;* 41 *arctophila;* 57, 60 *cordifolia* var. *callicarpaea;* 62 (pt.) *arctophila;* 62 (pt.) *glaucophylloides;* 65 *pedicellaris* var. *hypoglauca;* 72 *calcicola;* 77 *lucida* var. *angustifolia;* 77A, 95 *Bebbiana;* 99 *arctophila;* 105 *longifolia;* 106 *cordifolia* var. *callicarpaea;* 113 *planifolia;* 114 *arctophila;* 115 *argyrocarpa;* 121, 178 *cordifolia* var. *callicarpaea;* 179 *planifolia;* 193, 216 *arctophila;* 240 *planifolia;* 244, 245 *cordifolia* var. *callicarpaea;* 333, 342 *alaxensis* var. *obovalifolia;* 355 *arctophila;* 383, 384 *glauca* var. *acutifolia;* 408 *calcicola;* 432 *brachycarpa* var. *antimima;* 435, 485, 487 *glauca* var. *acutifolia.*

GRISCOM, LUDLOW: 28034 *Bebbiana.*

LEWIS, HARRISON F.: 130688, 130689 *vestita;* 130697–130701 *cordifolia* var. *Macounii;* 130702, 130703 ? *cordifolia* var. *intonsa;* 130704, 130705 *cordifolia* var. *callicarpaea;* 130706 *cordifolia* var. *typica;* 130707–130710 *cordifolia* var. *callicarpaea;* 130711, 130712 *cordifolia* var. *typica;* 130713 *cordifolia* var. *callicarpaea;* 130714–130717 *pellita* f. *psila;* 130718 *candida* var. *denudata;* 130719–130722 *candida;* 130723–130727 *pyrifolia;* 130728 *glaucophylloides;* 130729–130736 *planifolia;* 130737, 130738 *paraleuca;* 130739, 130740 *humilis* var. *keweenawensis;* 130741–130744 *humilis;* 130745, 130746 *simulans;* 130747–130750 *Bebbiana;* 130751 *discolor* var. *latifolia;* 130752, 130753 *lucida* var. *intonsa;* 130754 *lucida.*

LONG, BAYARD: 28038, 28055 *planifolia.*

LOW, A. P.: 6048 *vestita;* 6049, 6050 *arctophila;* 6051 *Uva-ursi;* 13687a *cordifolia* var. *callicarpaea;* 23035 *Uva-ursi;* 23037 *arctica* var. *Brownei;* 23038 *calcicola;* 23039 *arctophila;* 24769 *cordifolia* var. *Macounii;* 24770, 24771 × *Waghornei;* 24772 *planifolia;* 24774 *arctophila;* 24775 *cordifolia* var. *callicarpaea;* 54353 *herbacea;* 63269 *arctophila;* 63270 *reticulata;* 63271 *arctophila ?;* 63272 *brachycarpa* var. *antimima.*

MACOUN, J. M.: 2004 *adenophylla;* 2028 *serissima;* 18822 *hudsonensis;* 18827 *arctophila;* 18847, 18850 *reticulata;* 24303 *candida;* 24513 *cordifolia* var. *Macounii;* 24563 *humilis* var. *keweenawensis;* 24618 *serissima;* 24625 *calcicola;* 24635 *glauca* var. *acutifolia;* 24636 *Bebbiana;* 24640, 24643 *pedicellaris* var. *hypoglauca;* 24819 *vestita;* 79142 *reticulata;* 79143 *vestita* var. *erecta;* 79144 *candida;* 79145 *herbacea;* 79146, 79147 *reticulata;* 79148 *hudsonensis;* 79149 *herbacea;* 79150, 79151 *Uva-ursi;* 79152 *arbusculoides;* 79153 *planifolia;* 79154, 79155 *calcicola;* 79156, 79156a *brachycarpa* var. *antimima;* 79157 × *Waghornei;* 79158 *arctophila;* 79159 *glauca* var. *acutifolia;* 79161 *fullertonensis;* 79162 *hudsonensis ?;* 79163–79166 *fullertonensis;* 79167 *hudsonensis;* 79168 *arctophila.*

MACOUN, JOHN: 4 *reticulata;* 19, 34 *lutea;* 18818 *arctophila;* 24302 *pellita;* 24349 *glaucophylloides;* 24460 *brachycarpa;* 24564 *glaucophylloides;* 24584 *serissima;* 24813 *vestita;* 100616 *candida.*

MALTE, M. O.: 118598 *arctica* var. *kophophylla;* 118617 *arctica* var. *Brownei;* 118620 *cordifolia* var. *callicarpaea;* 118644, 118645, 118654 *reticulata;* 118658 *cordifolia* var. *typica;* 119874 *cordifolia* var. *intonsa;* 119885 *pellita* f. *psila;* 119900 *pyrifolia;* 119974 *planifolia;* 119992 *reticulata;* 119995 *Uva-ursi;* 120005 *arctica* var. *kophophylla;* 120019 *herbacea;* 120021 *calcicola;* 120022 *reticulata;* 120039 *Uva-ursi;* 120053 *herbacea;* 120065 *Uva-ursi;* 120170, 120172 *arctica* var. *kophophylla;* 120182, 120184, 120213 *cordifolia* var. *callicarpaea;* 120217 *calcicola;* 120220 *glauca* var. *acutifolia;* 120221 *reticulata;* 120222 *arctica* var. *Brownei;* 120224 *cordifolia* var. *callicarpaea;* 120225 *calcicola;* 120226, 120228, 120230 *cordifolia* var. *callicarpaea;* 120231 *glauca* var. *acutifolia;* 120232 *cordifolia* var. *callicarpaea;* 120233 *glauca* var. *acutifolia;* 120234 *arctica* var. *Brownei;* 120235, 120251 *cordifolia* var. *callicarpaea;* 120253 *arctica* var. *Brownei;* 120255, 120258 *cordifolia* var. *callicarpaea;* 120281 *calcicola;* 120416 *arctica* var. *Brownei;* 120463 *herbacea;* 120466, 120483, 120486, 120492 *hudsonensis;* 120516 *alaxensis* var. *obovalifolia;* 120517, 120543 *hudsonensis;* 120565 *fullertonensis;* 120566 *arctophila;* 120576, 120597, 120691 *Richardsonii;* 120701, 120703, 120705 *cordifolia* var. *callicarpaea;* 120745 *herbacea;* 120755 *cordifolia* var. *callicarpaea;* 120757 *calcicola;* 120760 *arctica* var. *kophophylla;* 120762 *cordifolia* var. *callicarpaea;* 120764 *cordifolia* var. *typica;* 120766, 120767 *cordifolia* var. *callicarpaea;* 120769 *calcicola;* 120771, 120773, 120774 *cordifolia* var. *callicarpaea;* 120793, 120796 *reticulata;* 120812 *cordifolia* var. *callicarpaea;* 120817, 120820 *arctica* var. *kophophylla;* 120822 *cordifolia* var. *callicarpaea;* 120831 *Uva-ursi;* 120882 *arctica* var. *Brownei;* 120888 *reticulata;* 120889 *arctica* var. *Brownei;* 120890 *calcicola;* 120901, 120903 *arctica* var. *Brownei;* 120908 *cordifolia* var. *typica;* 120915, 120917 *arctica* var. *Brownei;* 120954 *cordifolia* var. *callicarpaea;* 120976 *herbacea;* 121050, 121052 *Uva-ursi;* 121056, 121062 *reticulata;* 126775 *arctophila;* 126798

arctica var. *Brownei;* 126800 *herbacea;* 126803, 126804 *arctica* var. *Brownei;* 126805 *Uva-ursi;* 126816 *arctica* var. *Brownei;* 126818 *calcicola;* 126819, 126820 *arctica* var. *Brownei;* 126821 *calcicola;* 126822 *reticulata;* 126824, 126831, 126833 *calcicola;* 126835 *arctica* var. *Brownei;* 126837 *Uva-ursi;* 126838, 126905, 126909 *calcicola;* 126917 *cordifolia* var. *callicarpaea;* 126941 *Uva-ursi;* 127002 *cordifolia* var. *callicarpaea;* 127004 *glauca* var. *acutifolia;* 127006, 127008 *cordifolia* var. *callicarpaea;* 127012 *glauca* var. *acutifolia;* 127014 *cordifolia* var. *callicarpaea;* 127016 *arctophila;* 127020 *herbacea;* 127026 *brachycarpa* var. *antimima;* 127027, 127029 *calcicola;* 127031 *cordifolia* var. *intonsa;* 127034 *arctica* var. *Brownei;* 127038 *calcicola;* 127039 *arctica* var. *Brownei;* 127040 *cordifolia* var. *callicarpaea;* 127042 *calcicola;* 127044, 127046 *cordifolia* var. *callicarpaea;* 127048 *herbacea;* 127049, 127051, 127053 *cordifolia* var. *callicarpaea.*

MARTIN: 2 *cordifolia* var. *Macounii;* 4 *cordifolia* var. *callicarpaea.*

NEY, C. H., & J. COURTRIGHT: 1823 *calcicola;* 2402 *arctica* var. *Brownei;* 2411 *cordifolia* var. *callicarpaea;* 2424 *calcicola;* 2427 *herbacea;* 2435 *Uva-ursi.*

OLDENBURG, M. E.: 5 *arctophila;* 17, 25 *cordifolia* var. *callicarpaea;* 34 *planifolia;* 37A, 39C *vestita;* 51A *herbacea;* 51B *Uva-ursi;* 82 *reticulata;* 157B *Uva-ursi;* 157C (pt.) *cordifolia* var. *callicarpaea;* 157C (pt.) *calcicola;* 157C (pt.) *arctophila;* 157C (pt.) *arctica* var. *Brownei;* 170A (pt.) *reticulata;* 170A (pt.) *arctophila ?;* 188A *calcicola* var. *Nicholsiana;* 188B *arctica* var. *Brownei;* 188C *reticulata;* 188D *Richardsonii;* 212A *arctophila;* 230A (pt.) *Uva-ursi;* 230A (pt.) *arctophila;* 230B, 255A (pt.) *calcicola;* 255A (pt.) *cordifolia* var. *callicarpaea.*

POLUNIN, NICHOLAS: 90 *arctophila;* 1001 *cordifolia* var. *callicarpaea;* 1013 *vestita;* 1014 (pt.) *Uva-ursi;* 1014 (pt.) *arctophila;* 1035 *planifolia;* 1053 *cordifolia* var. *callicarpaea;* 1101, 1301, 1349 *arctica* var. *Brownei;* 1380 *herbacea;* 1385 *cordifolia* var. *callicarpaea;* 1536 *arctophila;* 1548 *cordifolia* var. *callicarpaea;* 1574 *calcicola;* 1764 *arctophila;* 1864 *brachycarpa* var. *antimima;* 2013 *candida;* 2023 *planifolia;* 2025, 2034, 2073 *glauca* var. *acutifolia;* 2146 *hudsonensis;* 2148 (pt.) *arbusculoides ?;* 2148 (pt.) *arctophila;* 2149 *alaxensis* var. *obovalifolia;* 2181, 2197 *fullertonensis;* 2199 *hudsonensis;* 2233 *herbacea;* 2237 *arctophila;* 2244 *planifolia.*

PORSILD, A. E.: 21 *herbacea;* 26 *argyrocarpa;* 27 *herbacea;* 28 *Uva-ursi;* 29–31 *cordifolia* var. *callicarpaea;* 32, 33 *arctophila;* 89 *cordifolia* var. *callicarpaea;* 90–92 *arctophila;* 93, 129, 130 *cordifolia* var. *callicarpaea;* 180 *Uva-ursi;* 181 *vestita.*

POTTER, DAVID: 833, 884–886 *Bebbiana;* 887, 888 *planifolia;* 890 *humilis* var. *keweenawensis;* 891, 893 *candida* var. *denudata;* 894, 895 *longifolia;* 896–898 *candida;* 899 *candida* var. *denudata;* 900–902 *pedicellaris* var. *hypoglauca;* 903 *glaucophylloides;* 904 *brachycarpa* var. *antimima;* 905 *brachycarpa;* 906, 907 *brachycarpa* var. *antimima;* 908 *adenophylla;* 909 *cordifolia* var. *callicarpaea;* 910, 911 *lucida* var. *angustifolia;* 912 *lutea;* 913 *cordata;* 914 *cordifolia* var. *callicarpaea;* 915 *myrtillifolia;* 916 *discolor ?;* 917 *glaucophylloides.*

PREBLE, E. A., & A. E.: 41 *brachycarpa* var. *antimima;* 43, 46 *hudsonensis.*

ROSS, A. H. D.: 24358 *adenophylla.*

ST. JOHN, HAROLD: 90345–90348 *discolor* var. *latifolia;* 90349 *lucida;* 90350 *lucida* var. *intonsa;* 90351–90353 *argyrocarpa ?;* 90354, 90355 *humilis;* 90356 *humilis* × *planifolia;* 90357–90362 *planifolia;* 90363 *discolor* var. *latifolia;* 90364–90368 *planifolia;* 90369 *cordata;* 90370 *pyrifolia;* 90371, 90372 *candida;* 90373, 90374 *pellita;* 90375, 90376 *Uva-ursi;* 90377 *vestita;* 90378 *vestita* var. *psilophylla;* 90835–90840 *cordifolia* var. *callicarpaea;* 90841 *cordifolia* var. *cucycla;* 90842 *cordifolia* var. *callicarpaea;* 90843, 90844 *arctophila;* 90845, 90846 *cordifolia* var. *callicarpaea.*

SEWELL, C. S.: 11 *vestita;* 128 *planifolia;* 129 *arctophila;* 130 *argyrocarpa;* 457 *herbacea;* 458 (pt.) *argyrocarpa;* 458 (pt.) *Uva-ursi;* 459 *cordifolia* var. *callicarpaea;* 460 *arctophila;* 462 *argyrocarpa;* 463–467 *planifolia.*

SOPER, J. D.: 111432, 122083 *cordifolia* var. *callicarpaea;* 122084 *vestita;* 122085 *planifolia;* 122086 *vestita.*

SORNBORGER, J. D.: 1 *cordifolia* var. *Macounii;* 2 *arctophila;* 4 *cordifolia* var. *callicarpaea;* 5 *arctophila;* 7 *cordifolia* var. *callicarpaea;* 8, 9 *Uva-ursi;* 10, 117 *herbacea;* 171 *argyrocarpa;* 176 *Uva-ursi;* 179 *vestita.*

SPREADBOROUGH, WM.: 13655 *Uva-ursi;* 13656 *vestita;* 13661 *reticulata;* 13662 *argyrocarpa;* 13681 *herbacea;* 13683 *glauca* var. *acutifolia;* 13683a *cordifolia* var. *callicarpaea;* 13687 *arctophila;* 13697 *calcicola;* 24510 *glauca* var. *acutifolia;* 54354, 54355 *arctophila;* 54361 *Uva-ursi;* 62015 *calcicola;* 62618 *hudsonensis;* 62619 *lucida;* 62620(1) *brachycarpa* var. *antimima ?;* 62620(2) *glauca;* 62621 *longifolia;* 62628 *serissima;* 62629 *reticulata;* 62630, 62631 *adenophylla.*

STECKER, A.: 3 *cordifolia* var. *intonsa.*

Townsend, C. W.: 16 *cordifolia* var. *intonsa;* 19 *arctophila;* 28 *argyrocarpa;* 32 *arctophila;* 36 *Uva-ursi;* 38 *planifolia.*

Turner, L. M.: 627 *herbacea;* 629 *Uva-ursi;* 4817 *arctica* var. *Brownei;* 6310 *vestita.*

Tyrrell, J. W.: 1711 *cordifolia* var. *callicarpaea;* 1717 *herbacea;* 1762 *Richardsonii;* 1763, 1763a, 1763b *planifolia;* 1765 *alaxensis* var. *obovalifolia;* 18834 *arctophila.*

Victorin, Fr. Marie: 4348 *candida;* 4349-4351 *cordifolia* var. *callicarpaea;* 4374 *candida.*

Victorin, Fr. Marie, & Fr. Rolland-Germain: 18884 *lucida;* 18885 *laurentiana;* 18886 *lucida;* 18889, 18890 *planifolia;* 18891 *Bebbiana;* 18892 *glaucophylloides;* 18893 *pellita* f. *psila;* 18894 *discolor;* 18895–18900 *vestita;* 18901 *vestita* var. *erecta;* 18902–18907 *candida;* 18908 *laurentiana;* 18909 *glaucophylloides;* 18910, 18911 *cordifolia* var. *callicarpaea;* 18912 *humilis* var. *keweenawensis;* 18913 *cordifolia* var. *callicarpaea;* 18914 *discolor;* 18915 *cordifolia* var. *Macounii;* 18916 *cordifolia* var. *callicarpaea;* 18917 *laurentiana;* 18918, 18919 *pyrifolia;* 18920 *Bebbiana;* 18921 *glaucophylloides;* 18922–18930 *cordifolia* var. *callicarpaea;* 18931, 18932 *cordifolia* var. *Macounii;* 18933 *glaucophylloides;* 18934 *pellita;* 18935 *planifolia;* 18936, 18937, 21658, 21659 *Bebbiana;* 21679 *cryptodonta;* 21680, 21682 *pellita;* 21683 *vestita;* 21684 *candida;* 21685 *vestita;* 21686 *cordifolia var. typica;* 21687 *lucida* var. *intonsa;* 21688 *cordifolia* var. *callicarpaea;* 21689 *candida;* 21690 *cordifolia* var. *callicarpaea;* 21691 *candida;* 21698 *cordifolia* var. *callicarpaea;* 21699 *Bebbiana;* 21700, 21701 *glaucophylloides;* 21702 *humilis* var. *keweenawensis;* 21703 *cordifolia* var. *Macounii;* 21704, 21705 *candida;* 21707 *Bebbiana;* 21709 *candida;* 21710 *Bebbiana;* 24731 *myrtillifolia;* 24732 *humilis;* 24733 *candida;* 24734–24738 *brachycarpa;* 24739 *candida;* 24783 *discolor;* 24785, 24786 *candida;* 24787 *pellita;* 24788 *discolor;* 24789, 24790, 24795 *candida;* 24796 *Bebbiana;* 24797 *lucida;* 24798 *pellita* f. *psila;* 24799 *candida;* 24800 *vestita;* 24801 *glaucophylloides;* 24802 *lucida* var. *intonsa;* 24803 *glaucophylloides;* 24804 *pellita* f. *psila;* 24805 *glaucophylloides;* 24939, 24940 *Bebbiana;* 24941 *discolor;* 24942, 24943 *Bebbiana;* 24944 *discolor;* 24945 *humilis;* 24951 *Bebbiana;* 24974 *lucida* var. *intonsa;* 25076 *pellita* f. *psila;* 25182–25186 *cordifolia* var. *Macounii;* 25187, 25188 *cordifolia* var. *callicarpaea;* 25300 *cordifolia* var. *Macounii;* 25922, 25925 *cordifolia* var. *callicarpaea;* 25932 *cordifolia* var. *Macounii;* 27727–27730 *discolor* var. *latifolia;* 27731 *candida;* 27732, 27733 *discolor* var. *latifolia;* 27734 *myrtillifolia;* 27735, 27736 *candida;* 27737 *myrtillifolia;* 27738 *pellita;* 27739 *pellita* f. *psila;* 27740 *planifolia;* 27741 *humilis;* 27742 *pellita* f. *psila;* 27743 *discolor;* 27744 *pellita;* 27745 *discolor* var. *latifolia;* 27746 *pellita* f. *psila;* 27747 *Bebbiana;* 27748 *discolor* var. *latifolia;* 27749–27753 *Bebbiana;* 27754 *lucida* var. *intonsa;* 27755, 27756 *glaucophylloides;* 27757 *discolor* var. *latifolia;* 27758 *pellita* f. *psila;* 27759, 27760 *Bebbiana;* 27761 *discolor* var. *latifolia;* 27762 *Bebbiana;* 27764 *brachycarpa;* 27765 *cordifolia* var. *callicarpaea;* 27766 *candida* var. *denudata;* 27767 *brachycarpa;* 27768 *pellita* f. *psila;* 27769 *arctophila;* 28096 *humilis;* 28098 *cordata;* 28100 *pellita* f. *psila;* 28106, 28116 *lucida* var. *intonsa;* 28171 *pellita.*

Waghorne, A. C.: 2 *vestita;* 3 (pt.) *pyrifolia;* 3 (pt.) *vestita;* 4 *arctophila;* 5 *planifolia;* 13 (pt.) *arctophila;* 13 (pt.) *candida;* 21 *cordifolia* var. *callicarpaea;* 33 *cordifolia* var. *tonsa;* 36 *cordifolia* var. *intonsa;* 38 *Uva-ursi;* 50, 51 *cordifolia* var. *callicarpaea;* 69 *arctophila;* 81–83 *planifolia;* 86, 91, 94, 95 *cordifolia* var. *callicarpaea;* 112 *herbacea;* 18829 *cordifolia* var. *callicarpaea.*

Wetmore, R. H.: 102920 *lucida* var. *angustifolia;* 102921 *lucida* var. *intonsa;* 102922 *planifolia;* 102923 *cordifolia* var. *callicarpaea.*

Wiegand, K. M., and others: 27950 *jejuna;* 27982 *cordifolia* var. *eucycla;* 27987, 27988 *cordifolia* var. *Macounii;* 27991 *cordifolia* var. *eucycla;* 28015 *calcicola;* 28039 *discolor.*

Wilson, W. J.: 53970 *candida;* 53971 *Bebbiana.*

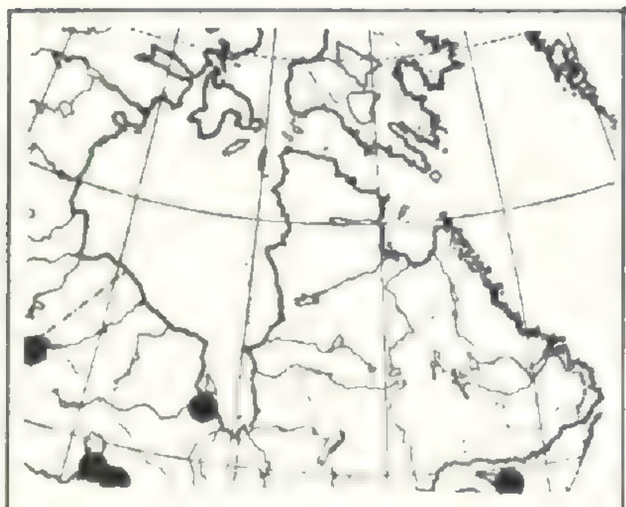
Woodworth, R. H.: 143 *reticulata;* 144 *vestita;* 145–148 *Uva-ursi;* 149–152 *herbacea;* 153 *arctica* var. *Brownei;* 154 *arctica* var. *kophophylla;* 155–161 *arctophila;* 162 *cordifolia* var. *tonsa;* 162½–165 *cordifolia* var. *intonsa;* 166, 166½ *cordifolia* var. *Macounii;* 167–173 *cordifolia* var. *callicarpaea;* 174 *calcicola;* 175–178 *planifolia;* 179 *Bebbiana;* 180, 181 *argyrocarpa.*

Wynne-Edwards, V. C.: 13 *arctophila;* 7051, 7052 *cordifolia* var. *callicarpaea;* 7053 *herbacea;* 7059, 7060 *cordifolia* var. *callicarpaea;* 7061 *vestita;* 7093 *Uva-ursi;* 7094 *arctophila;* 7162 *reticulata;* 7466 *vestita;* 7494 *planifolia;* 7495 *cordifolia* var. *intonsa;* 7551 *argyrocarpa.*

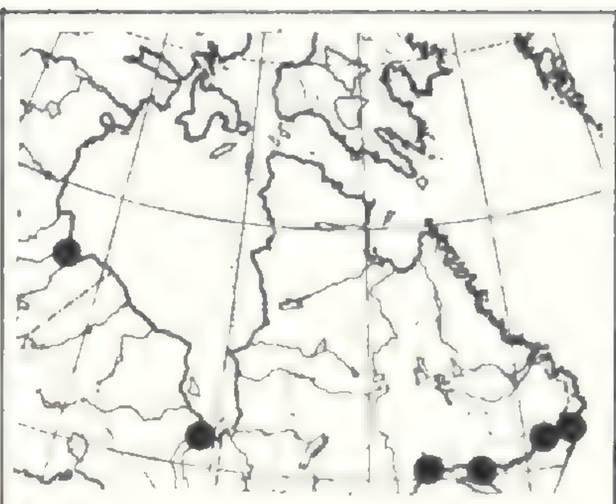
EXPLANATION OF PLATES I–IV

Range maps of the species, varieties, and forms of *Salix* in the Hudson Bay Region and Labrador Peninsula.

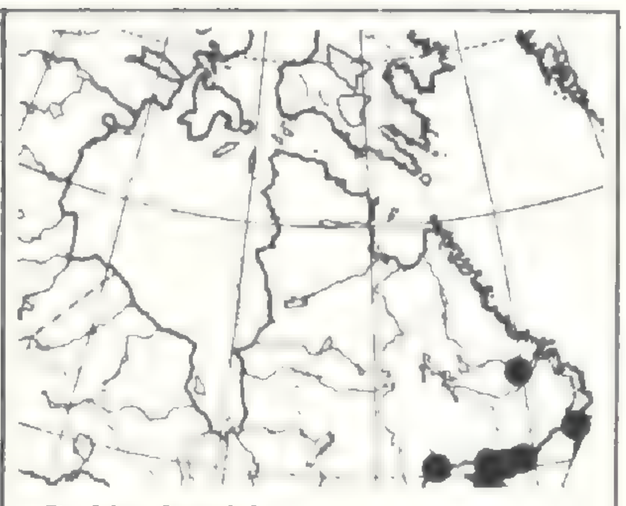
Arnold Arboretum,
Harvard University.



Salix serissima



Salix lucida



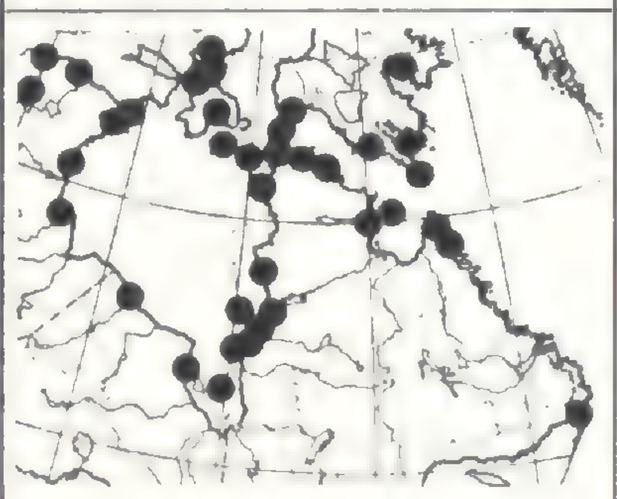
Salix lucida
var. intonsa



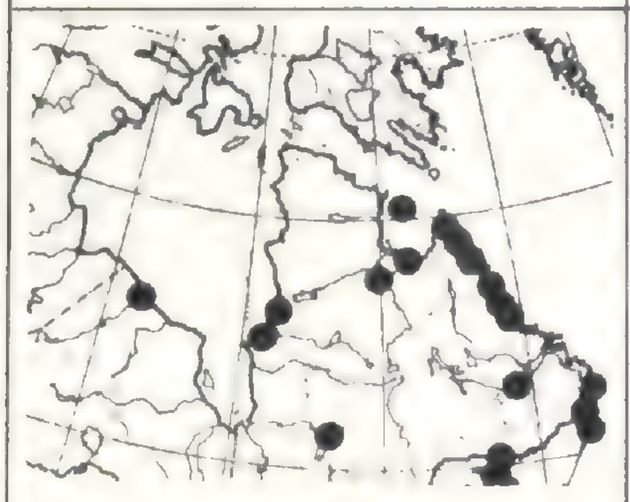
Salix lucida
var. angustifolia



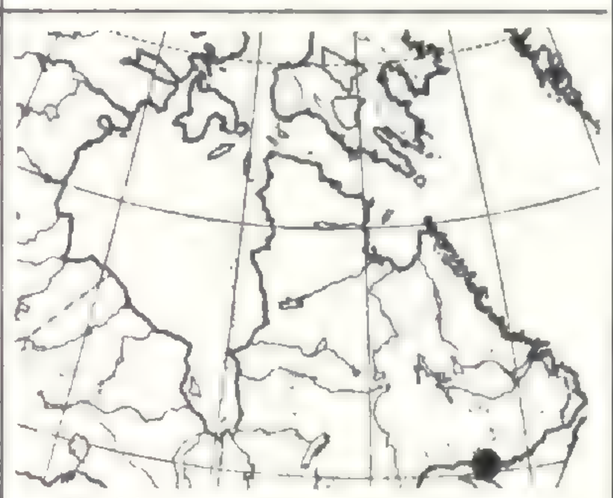
Salix interior



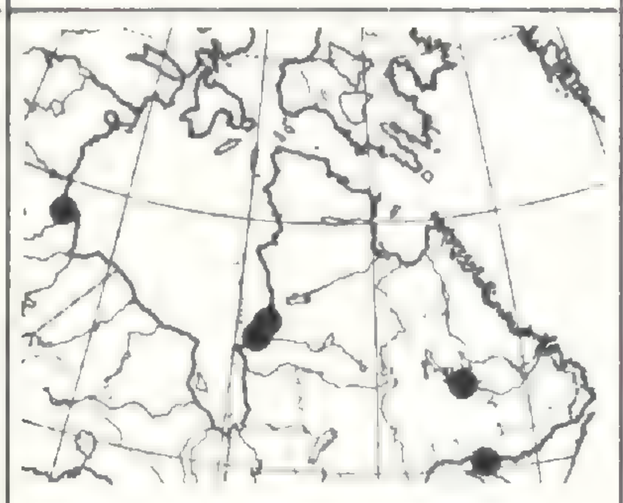
Salix reticulata



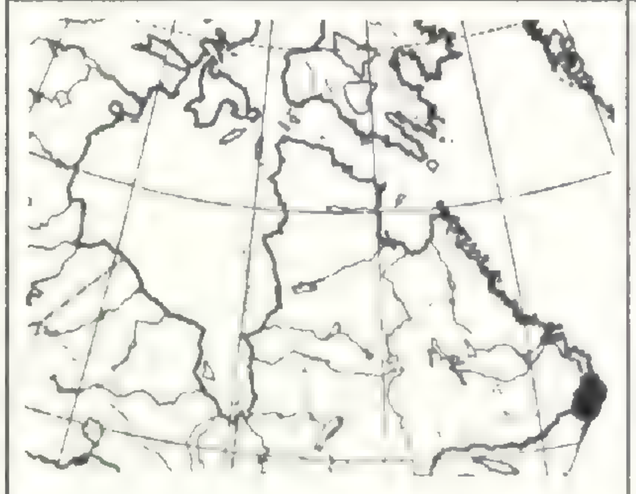
Salix vestita



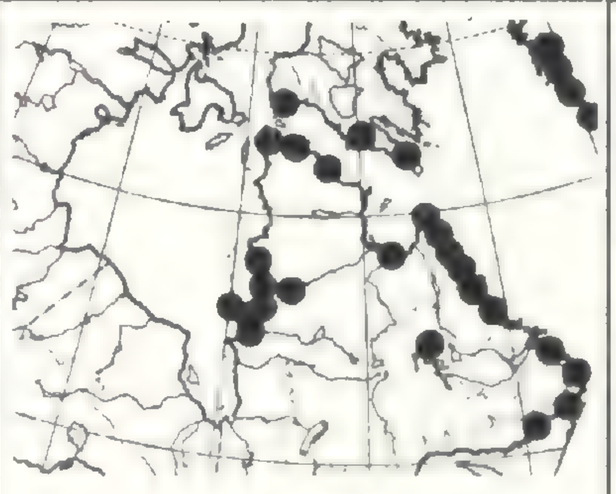
Salix vestita
var. psilophylla



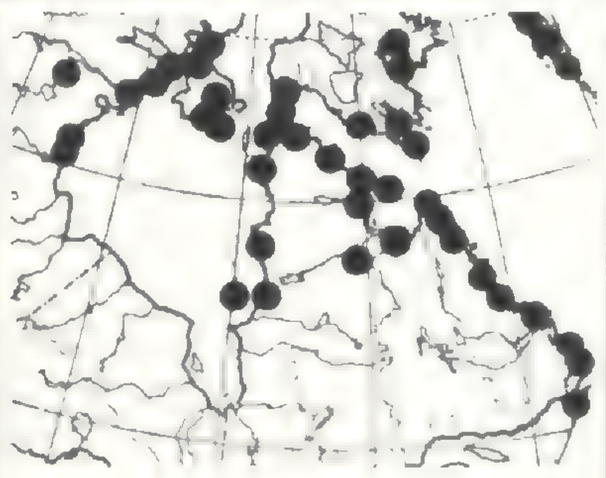
Salix vestita var. erecta



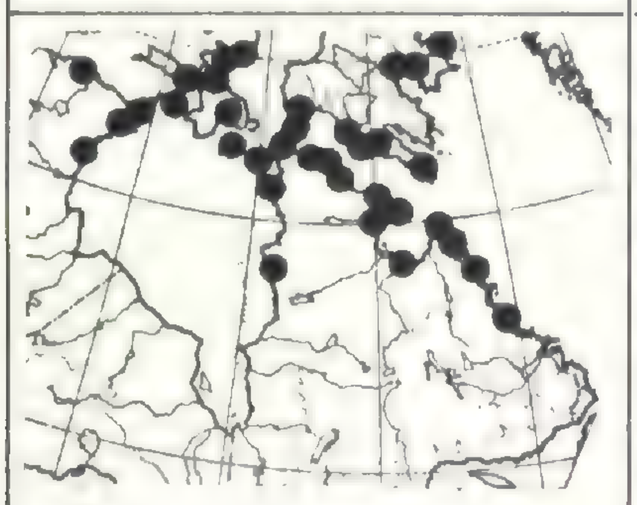
Salix jejuna



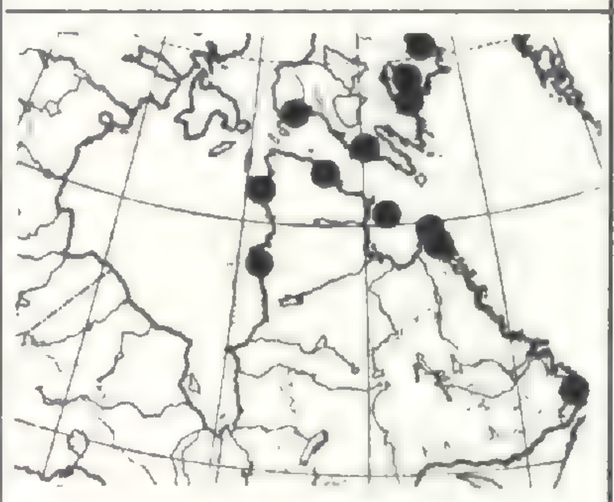
Salix Uva-ursi



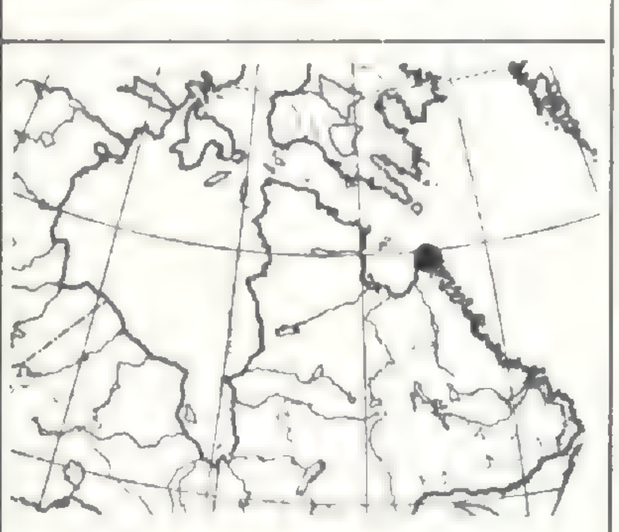
Salix herbacea



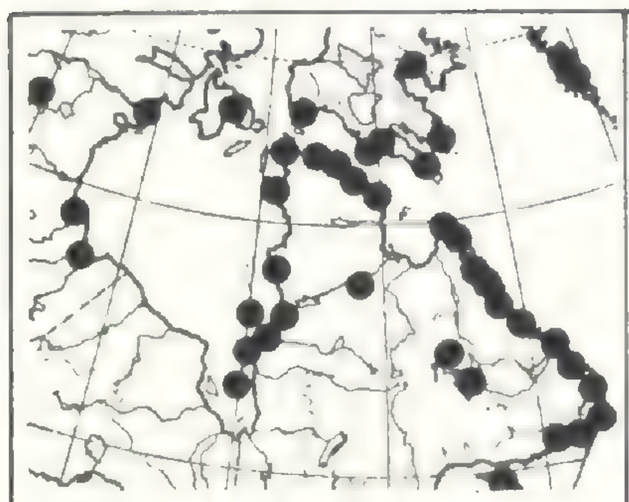
Salix arctica
var. Brownei



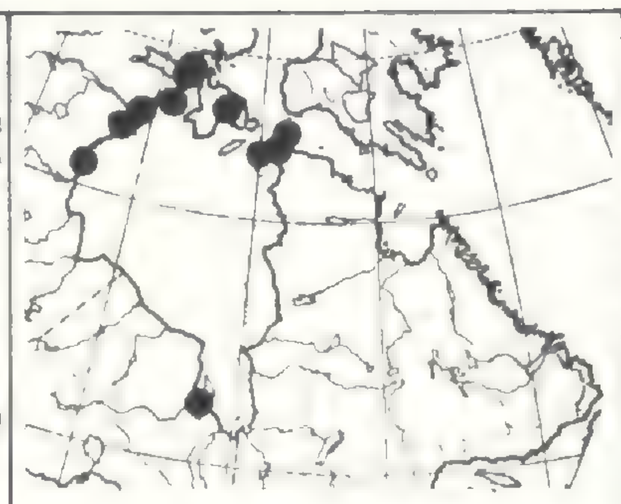
Salix arctica
var. kophophylla



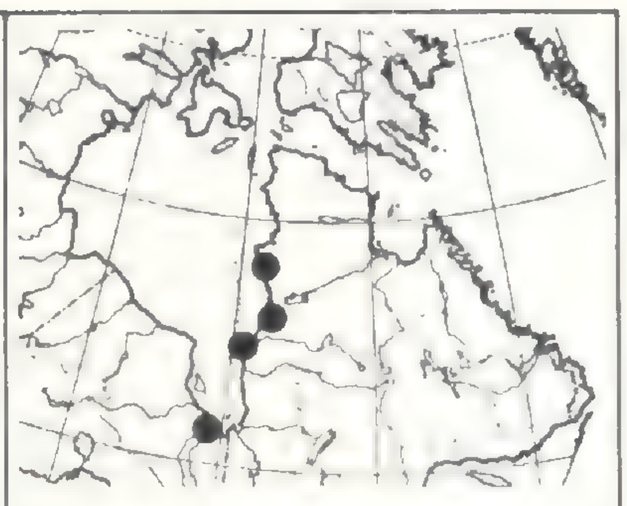
Salix arctica
var. araioclada



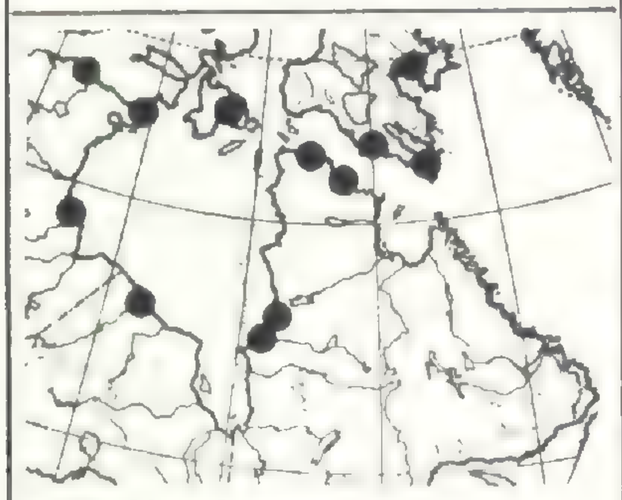
Salix arctophila



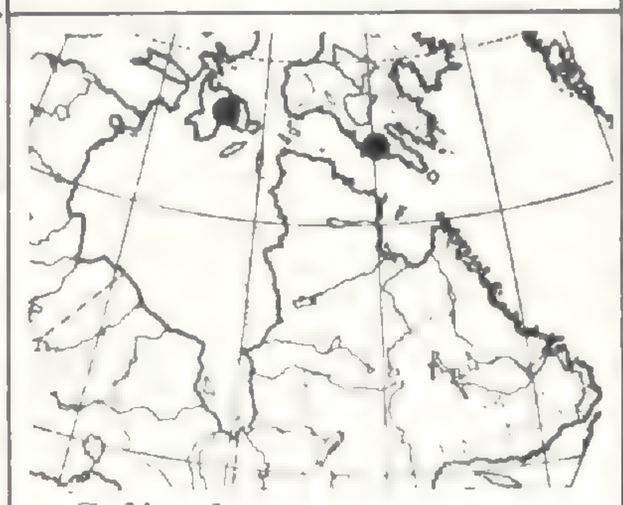
Salix hudsonensis



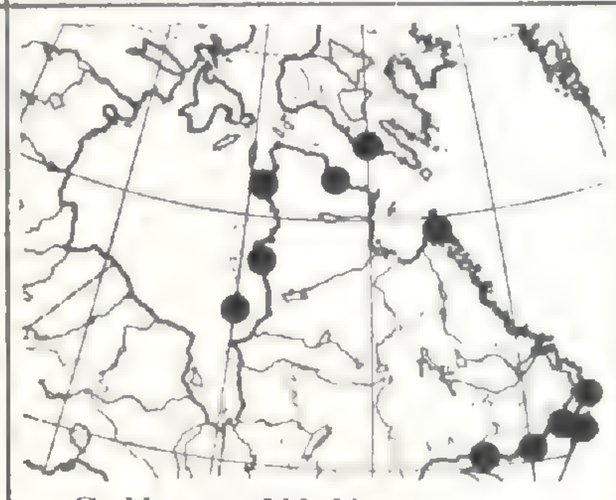
Salix glauca



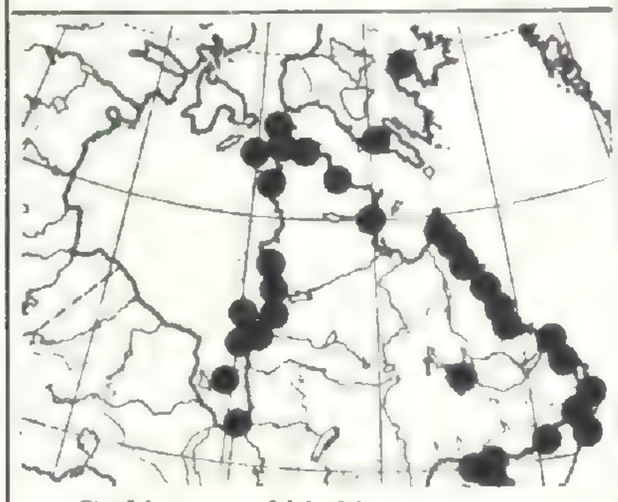
Salix glauca
var. acutifolia



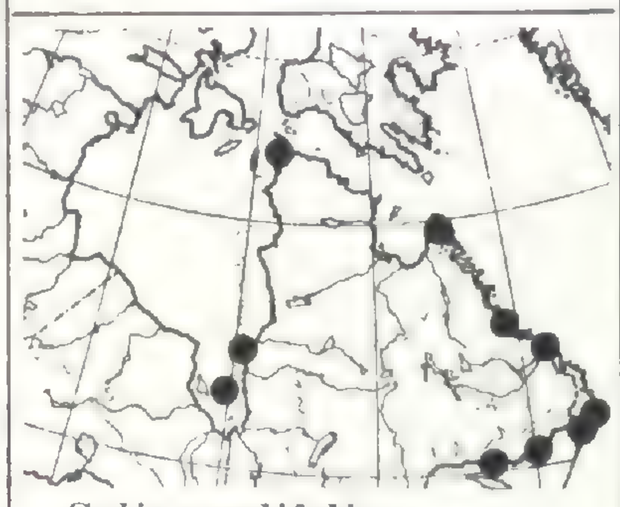
Salix glauca
var. stenolepis



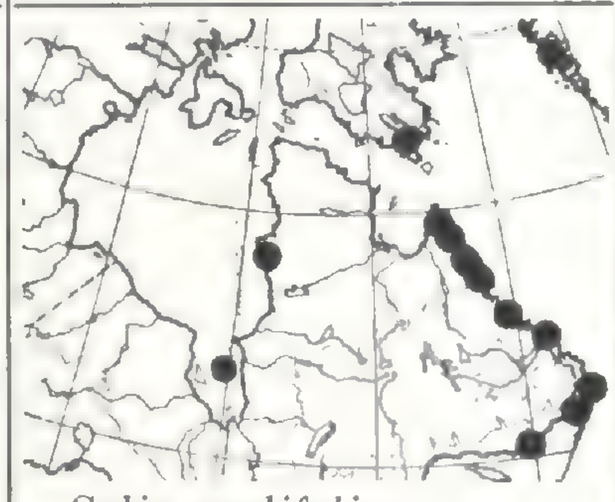
Salix cordifolia
var. typica



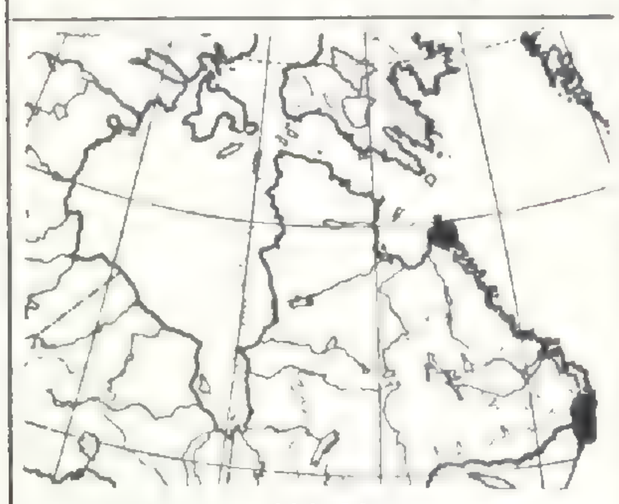
Salix cordifolia
var. callicarpaea



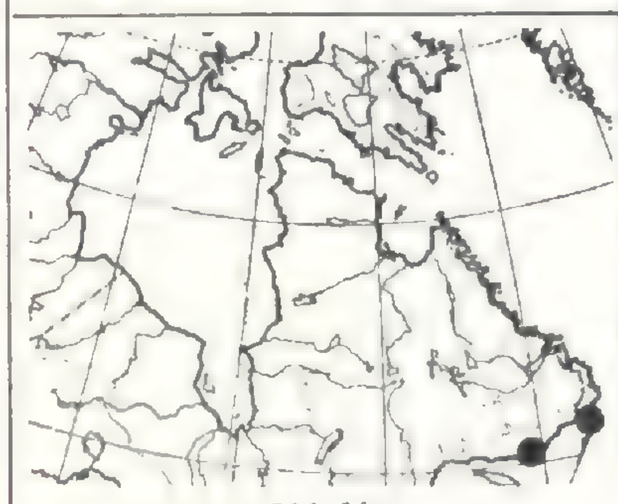
Salix cordifolia
var. Macounii



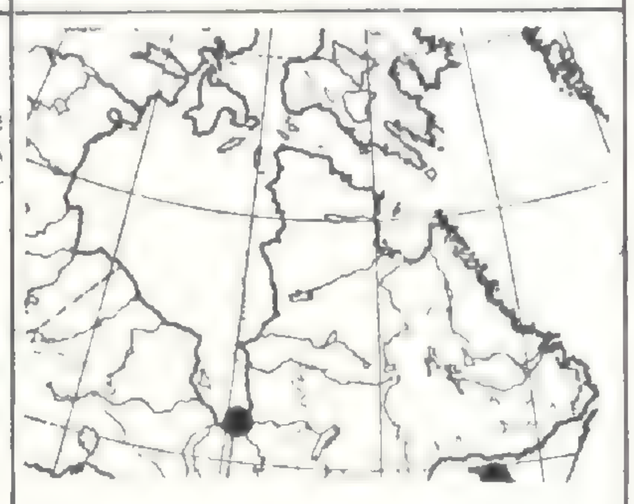
Salix cordifolia
var. intonsa



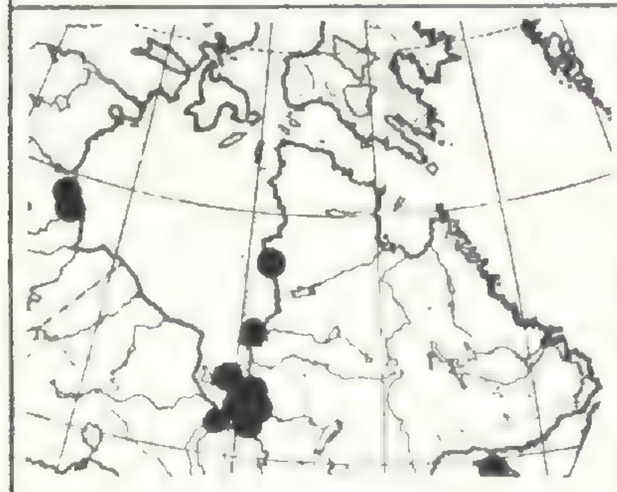
Salix cordifolia
var. tonsa



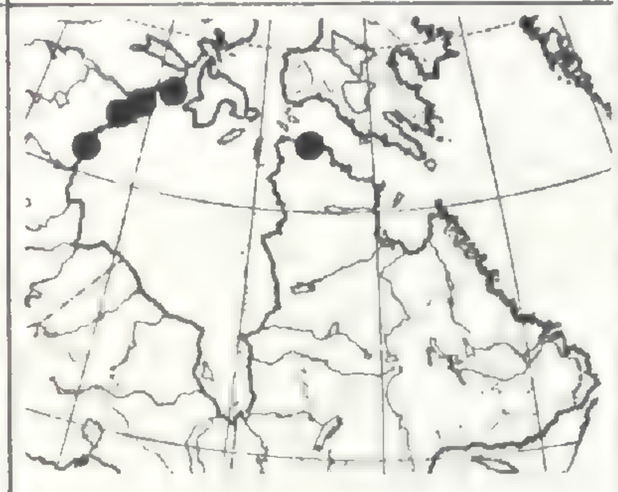
Salix cordifolia
var. eucycla



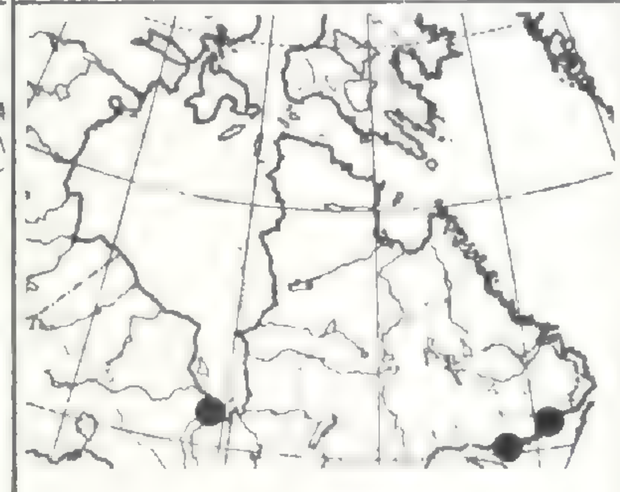
Salix brachycarpa



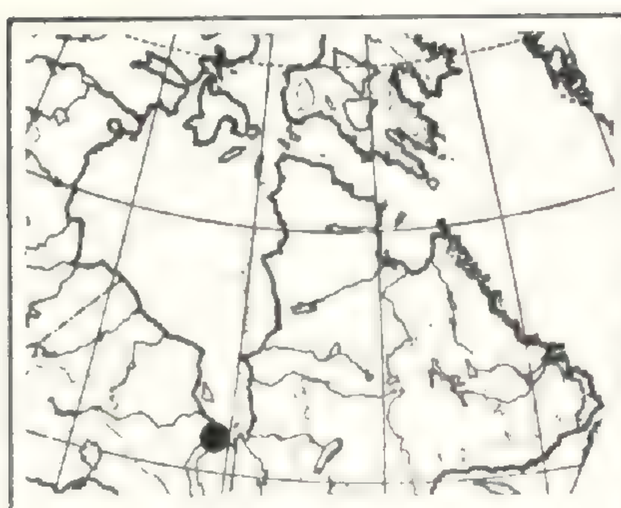
Salix brachycarpa
var. antimima



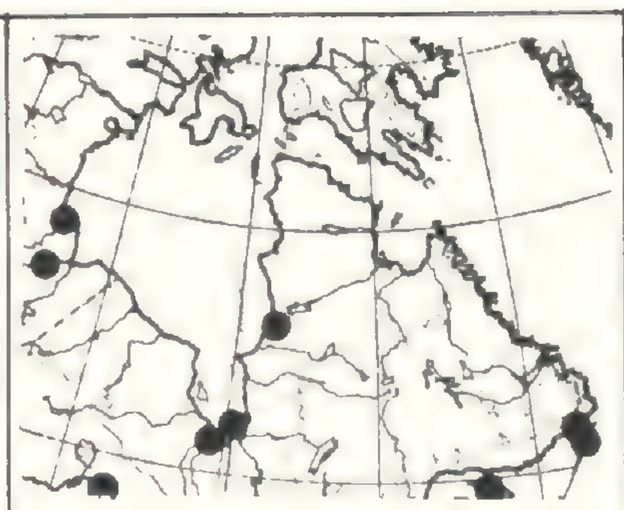
Salix fullertonensis



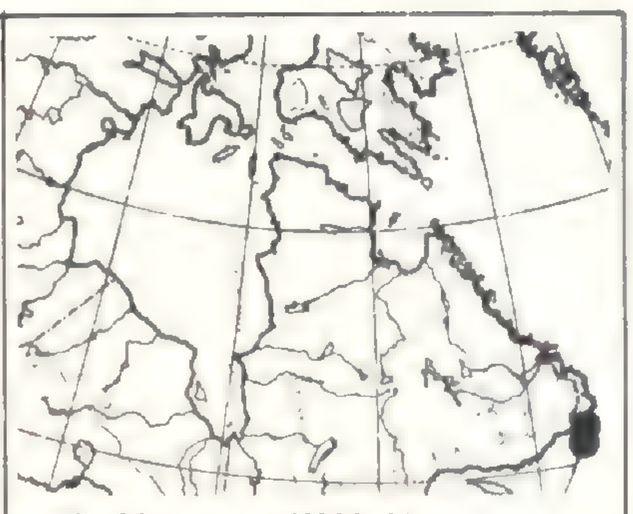
Salix cordata



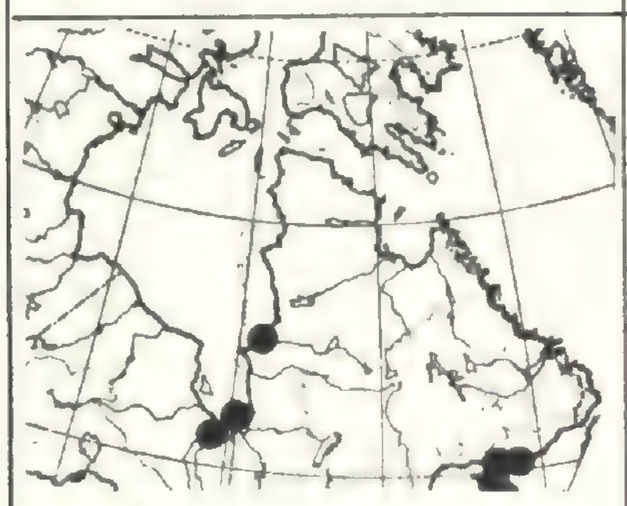
Salix lutea



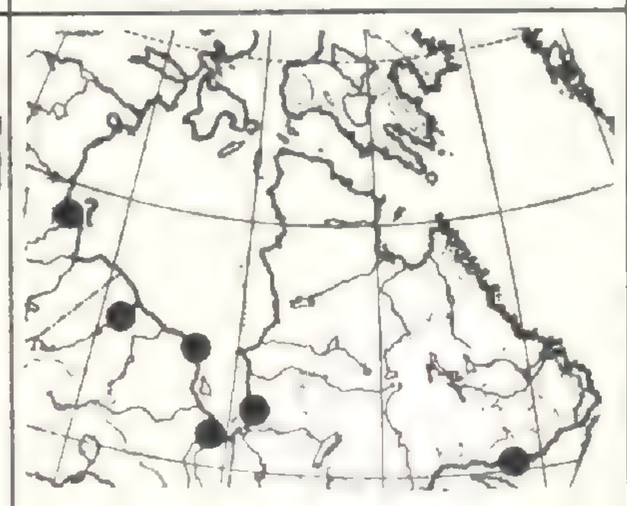
Salix myrtillifolia



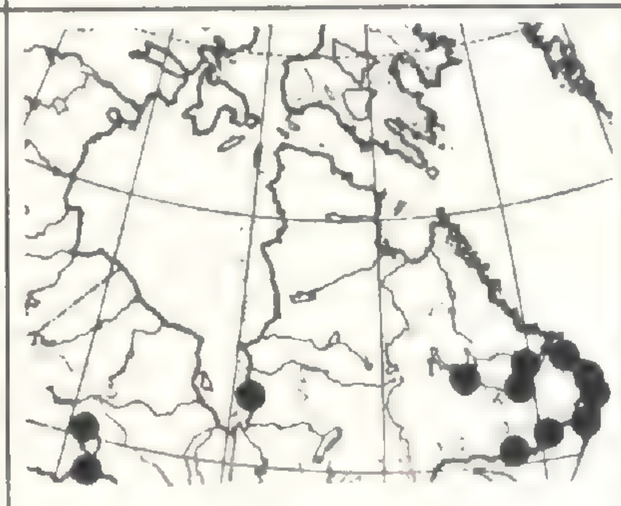
Salix myrtillifolia
var. brachypoda



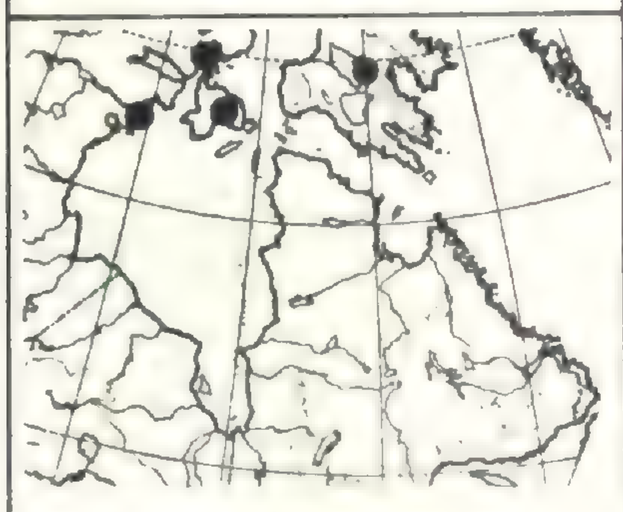
Salix glaucophylloides



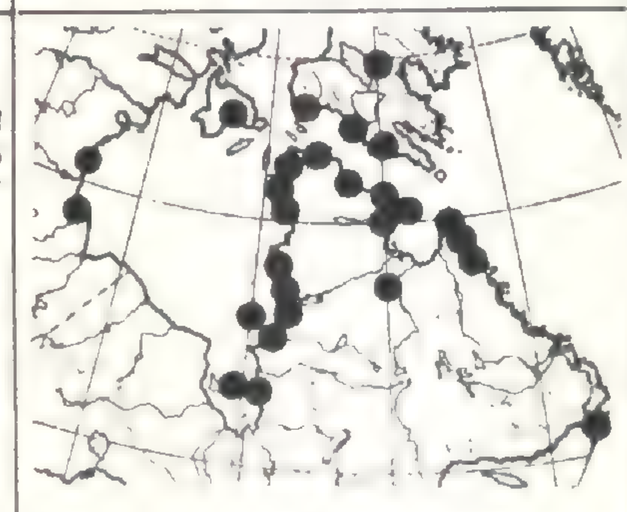
Salix adenophylla



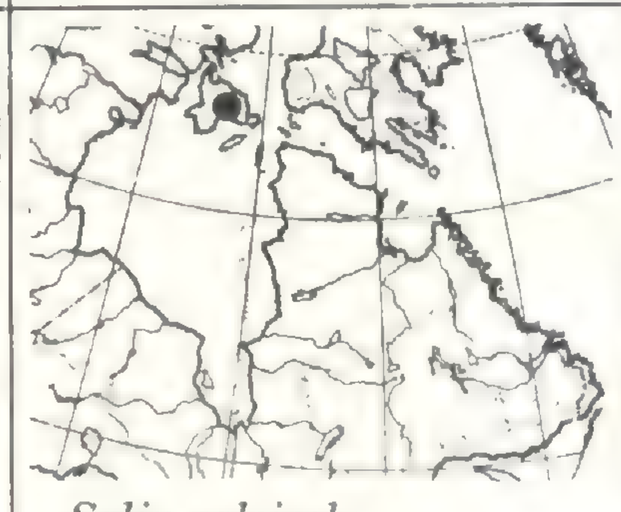
Salix pyrifolia



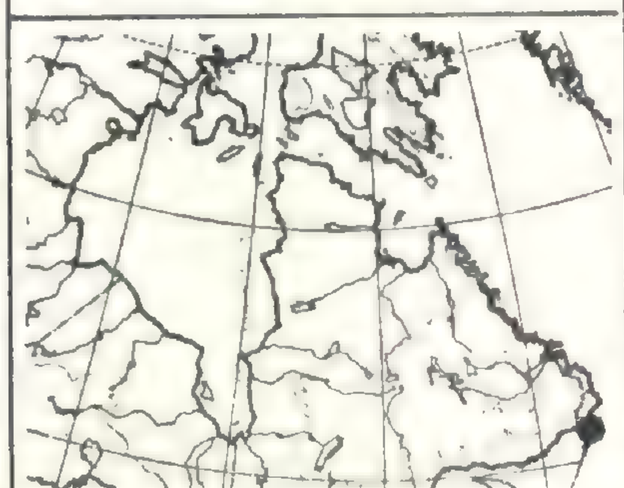
Salix Richardsonii



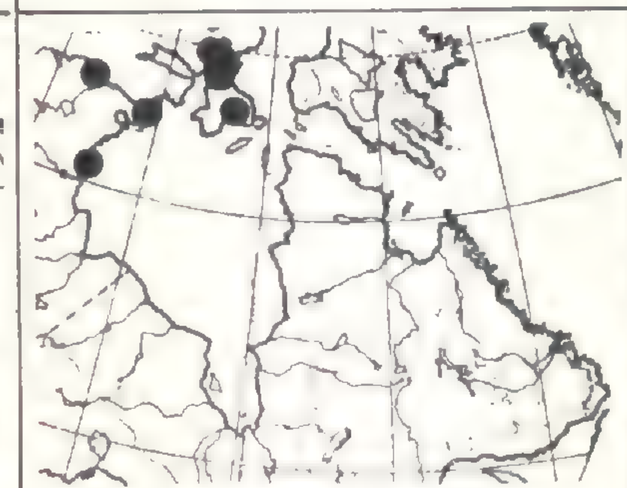
Salix calcicola



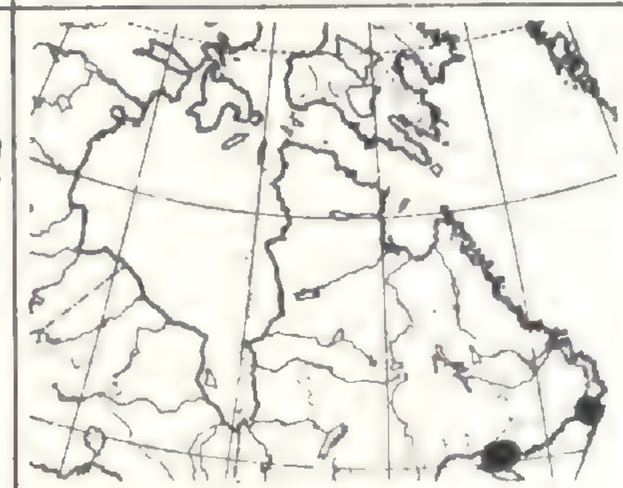
Salix calcicola
var. Nicholsiana



Salix Wiegandii



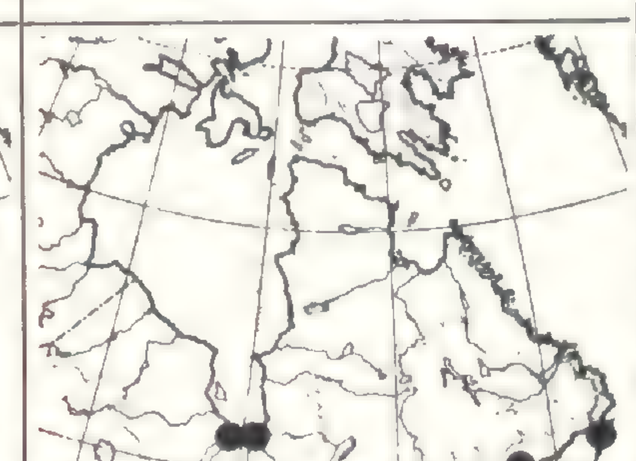
Salix alaxensis
var. obovalifolia



Salix laurentiana



Salix candida



Salix candida
var. denudata



Salix cryptodonta

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